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FEE TRANSMITTAL for FY 2005 JUN 03 2005 OFFICE OF THE PATENT & TRADEMARK COMMISSION		Application Number	09/825,611
		Filing Date	April 3, 2001
		First Named Inventor	Sharan et al.
		Examiner Name	Evan T. Pert
		Art Unit	2829
		Attorney Docket No.	95-0716.02
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27			
TOTAL AMOUNT OF PAYMENT	(\$)	500	

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify) : _____
☒ Deposit Account Deposit Account Number: 13-3092 Deposit Account Name: Micron Technology, Inc.

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee
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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee(\$)	Fee(\$)	Small Entity Fee(\$)	Fee(\$)	Small Entity Fee(\$)	
Utility	300	150	500	250	200	100	_____
Design	200	100	100	50	130	65	_____
Plant	200	100	300	150	160	80	_____
Reissue	300	150	500	250	600	300	_____
Provisional	200	100	0	0	0	0	_____

2. EXCESS CLAIM FEES

Fee Description

Each claim over 20 (including Reissues)

Fee (\$)

Small Entity Fee (\$)

Each independent claim over 3 (including Reissues)

50

25

Multiple dependent claims

200

100

Total Claims

Extra Claims

Fee(\$)

Fee Paid (\$)

Multiple Dependent Claims

3 -20 or HP (32) = 0 x 50 = 0

Fee (\$)

Fee Paid (\$)

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims

Extra Claims

Fee(\$)

Fee Paid (\$)

1 - 3 or HP (11) = 0 x 200 = 0

HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets **Extra Sheets** **Number of each additional 50 or fraction thereof** **Fee (\$)** **Fee Paid (\$)**
_____ - 100 = _____ / 50 = _____ (round up to a whole number) x = _____

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Fees Paid (\$)

Other (e.g., late filing surcharge): Brief on Appeal

500

SUBMITTED BY

Signature	Charles Brantley	Registration No. (Attorney/Agent)	38,086	Telephone	208-368-4557
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This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Sujit Sharan, et al.

Serial No: 09/825,611

Filed: April 03, 2001

For: METHOD FOR PECVD DEPOSITION
OF SELECTED MATERIAL FILMS

§ Group Art Unit: 2829
§
§
§ Examiner: Evan T. Pert
§
§ Atty. Docket: 95-0716.02
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APPLICANTS' BRIEF ON APPEAL

06/06/2005 MAHMED1 00000034 133092 09825611

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June 1, 2005

Date

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Related Proceedings Appendix:

Board decision dated 4/14/05 for U.S. App. Ser. No. 09/825,612

Omega Eng'g v. Raytek Corp., 334 F.3d 1314, 67 U.S.P.Q.2d 1321 (Fed. Cir. 2003)

In re Lee, 277 F.3d 1338, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002)

In re Zurko, 258 F.3d 1379, 59 U.S.P.Q.2d 1693 (Fed. Cir. 2001)



APPLICANTS' BRIEF ON APPEAL

I. REAL PARTY IN INTEREST

The Applicants, Sujit Sharan and Gurtej S. Sandhu, have assigned their interest in this application to Micron Technology, Inc.

II. RELATED APPEALS AND INTERFERENCES

Applicants received a Board decision dated 4/14/05 from the appeal in further prosecution of U.S. App. Ser. No. 09/825,612, which was filed 4/03/01 and is a sibling of the currently appealed application (both '612 and this application are divisionals of U.S. App. Ser. No. 09/249,478, filed 2/12/99 and issued as U.S. Pat. No. 6,291,341). A copy of the Board decision is included in the Related Proceedings appendix to this Appeal Brief.

U.S. App. Ser. No. 09/825,613, also filed on 4/03/01, is another sibling of the currently appealed application ('613 is a continuation of '478). Applicants filed a Reply Brief on 9/27/04. The Examiner acknowledged receipt and forwarding to the Board in an Office Communication dated 4/22/05.

There are no other appeals or interferences known to the Applicants or the assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF THE CLAIMS

Claims 1-66 have been presented during prosecution of the application under appeal.

Claims 1-36 and 40-66 have been canceled.

Claims 37-39 are pending.

Claims 37-39 are rejected.

Claims 37-39 are appealed.

IV. STATUS OF THE AMENDMENTS

Applicants filed no amendments subsequent to final rejection.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The current invention addresses an atmosphere for a chemical vapor deposition process. The atmosphere comprises a deposition gas having a chemical reactivity (Specification at p. 9, ln. 7; p. 10, ln. 4-5; element 30, FIGS. 1-3, 6); and a chemically inert reactivity increaser mixed with the deposition gas (*id.* at p. 4, ln. 25-p. 5, ln. 13; p. 10, ln. 26 - p. 11, ln. 2; p. 12, ln. 6-14; p. 14, ln. 23-p. 15, ln. 18; p. 16, ln. 1-12; element 32, FIGS. 1-3, 6). In a narrower embodiment within the scope of the invention, the deposition gas is a film precursor deposition gas. (*Id.* at p. 7, ln. 8-9.) In another embodiment within the scope of the invention, the deposition gas is a metal film precursor deposition gas. (*Id.* at p. 8, ln. 1-2; p. 13, ln. 13-16.)

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Claims 37-39 stand rejected under 35 U.S.C. §112 ¶2 as being indefinite.

Claims 37-39 stand rejected under 35 U.S.C. §112 ¶2 as omitting essential steps.

Claims 37-39 stand rejected under 35 U.S.C. §102 as being anticipated by European Patent No. 0483669.

VII. ARGUMENT

Applicants address each basis for rejection separately below.

A. Rejection of claims under §112 ¶2 for indefiniteness

The Examiner rejected claims 37-39 under 35 U.S.C. §112 ¶2 as being indefinite, arguing that the term “chemically inert reactivity increaser” was ambiguous. (Office Action dated 12/30/04 at p. 2.)

The Examiner’s support of this argument began with an attempted quote of the Specification’s paragraph [0012]. Applicants note that the Examiner’s quote does not exactly

track that of paragraph [0012], even after allowing for the parentheses the Examiner attempts to insert. (*Compare* Specification at ¶ [0012], 2d sentence (beginning with “In one embodiment, adding”) *with* Office Action dated 12/30/04 at p. 2 (incorrectly quoting that excerpt as beginning with “In one embodiment, a”).) Applicants should not be understood to be acquiescing to the Examiner’s interpretations of the Specification. Applicants refer the Board to the Specification’s express language and requests the Board interpret such independently.

Based on the misquotation, in which the Examiner also inserted parentheses, the Examiner complained about the diverse embodiments addressed in the Specification’s paragraph [0012] and appeared to independently arrive at a definition for “chemically inert reactivity increaser.” (Office Action dated 12/30/04, bottom of p. 2.)

Applicants emphasize that the test for definiteness is whether one of ordinary skill in the art would understand the bounds of the claim *when read in light of the specification*. (*Omega Eng’g v. Raytek Corp.*, 334 F.3d 1314, 67 U.S.P.Q.2d 1321, 1325 (Fed. Cir. 2003) (emphasis added).) If the claims, *read in light of the specification*, reasonably apprise those skilled in the art of the invention’s scope, §112 ¶2 demands no more. (*Id.* (emphasis added). A copy of *Omega* is included in the Related Proceedings appendix of the Appeal Brief.)

Significantly, when Applicants added the “chemically inert reactivity increaser” clarification, Applicants cited as non-limiting support the Specification’s references to properties concerning an ability to promote reaction (¶[0042]) as well as properties involving increased reaction rate or reactivity (¶¶[0014], [0036]). (*See* Response transmitted 6/29/04 at p. 5.) Applicants also noted that ¶ [0044] further addresses a property involving an increase in the rate of reaction of a process. Applicants still further noted that ¶ [0031] provides a more specific (yet still non-limiting) example in addressing argon’s promotion of stronger reactivity. The Response transmitted 6/29/04 also added paragraph [0014.5] to the Specification, thereby providing further non-limiting support. (Response transmitted 6/29/04 at p. 2.) Applicants contend that, in light of such non-limiting support in the Specification, one of ordinary skill in the art would understand the bounds of the claim and be reasonably apprised of the invention’s scope, and the Examiner’s attempt to define the limitation independently is unnecessary.

Applicants alert the Board that the Examiner failed to address such support in the Final Office Action dated 12/30/04. Applicants interpret the Examiner’s silence as an effective

admission of sufficient definiteness. Applicants request the Board interpret the Examiner's silence similarly.

Further, Applicants contend the Examiner's attempted alteration of the Specification's paragraph [0012] in no way refutes the Specification's non-limiting support cited above and previously during prosecution. Applicants further contend the express language of paragraph [0012] merely addresses several exemplary embodiments within the scope of the invention. As a result, the Specification's paragraph [0012] indicates broad claim scope rather than ambiguity.

Applicants also alert the Board that adding the "chemically inert reactability increaser" clarification was sufficient for the Examiner to withdraw the previous §102 rejection. (*See* Office Action dated 3/29/04 (citing U.S. Pat. No. 6,294,466 by Chang).) The Examiner's ability to appreciate the distinctions between the clarified claims and Chang suggests that the Examiner understood the bounds of the claims and was reasonably apprised of the invention's scope. Because the Examiner is presumed to act from the viewpoint of one of ordinary skill in the art (*In re Lee*, 277 F.3d 1338, 61 U.S.P.Q.2d 1430, 1435 (Fed. Cir. 2002)), it follows that such an artisan would enjoy a similar ability to understand the bounds of the claim and be reasonably apprised of the invention's scope. (A copy of *Lee* is included in the Related Proceedings appendix.)

Thus, for any one or combination of the reasons addressed above, Applicants contend the Examiner has failed to satisfy the burden for the §112 ¶2 rejection of claims 37-39.

B. Rejection of claims under §112 ¶2 for omitting essential steps

As another basis for rejecting the claims under §112 ¶2, the Examiner complained of an inability to reconcile the limitations that required claim 37's second element to be "chemically inert" yet also be a "reactability increaser." (Office Action dated 12/30/04 at p. 3.) The Examiner characterized the claims as "omitting essential steps" and "omit[ting] essential . . . process steps." (*Id.*) As a result, the Examiner once again independently arrived at a definition for "chemically inert reactability increaser." (*Id.*) Applicants note, however, the Examiner's second definition does not match the Examiner's first definition.

Moreover, in reaching the second definition, the Examiner announced that any noble gas that is part of chemical vapor deposition (CVD) is a "chemically inert reactability increaser." (Office Action dated 12/30/04 at p. 3.) Applicants contend the Examiner's announcement is

contrary to binding case precedent. In *In re Zurko* (258 F.3d 1379, 59 U.S.P.Q.2d 1693 (Fed. Cir. 2001)), the Patent and Trademark Office (PTO) rejected Zurko's claims based on the PTO's assumptions concerning the technology. (*See id.* at 1695, 97. A copy of *Zurko* is included in the Related Proceedings appendix.) In reversing the PTO, the Court held that the PTO "cannot simply reach conclusions based on its own understanding or experience." (*Id.* at 1697.) Rather, the Court required that the PTO "point to some concrete evidence in the record" to support its findings concerning aspects of the relevant technology. (*Id.*) The facts on appeal are analogous: the attempted claim rejection is based on the Examiner's assumptions about noble gases and their effect on CVD without citation to concrete evidence in the record. Such conduct is an invitation for reversal by the Board or Court.

Actually, the facts on appeal are even more in Applicants' favor than those in *Zurko* because (1) the record contains evidence that contradicts the Examiner's conclusion; (2) Applicants have highlighted that evidence previously; and (3) the Examiner appears to have agreed with Applicants' characterization of the contrary evidence. Specifically, the evidence on record addresses alternative and even contradictory properties of noble gases in CVD circumstances. In successfully refuting the previous §102 rejection, Applicants indicated the cited reference – Chang -- addresses argon in circumstances wherein alternate properties are in effect. (Response transmitted 6/29/04 at p. 5.) Such properties include those of a carrier (Chang at col. 3, ln. 43; col. 11, ln. 33) and a pressure stabilizer (*id.* at col. 10, ln. 3-11). Chang further suggests a circumstance where argon exhibits the exact opposite to the "reactability increaser" property of the clarified claims. Significantly, Chang identifies argon as an inert gas (col. 3, ln. 43; col. 10, ln. 3; col. 11, ln. 33) and expresses that inert gas has a diluent property (col. 1, ln. 41). Thus, having disclosed only alternative properties – including the exact opposite to the claimed property, Applicants concluded that Chang cannot be interpreted as anticipating the claims. (Response transmitted 6/29/04 at p. 5; *see also* Specification at ¶¶ [0034], [0035].) The Examiner's withdrawal of the Chang-based §102 rejection demonstrates the Examiner's position that a noble gas in a CVD process is not necessarily a "chemically inert reactability increaser." The Examiner's current attempt to contradict that is therefore untenable.

Applicants also note the Examiner's consistent reference to the lack of essential processes and steps appears to be misdirected, as claims 37-39 are not process/method claims; rather, they are directed to an atmosphere.

Moreover, the very MPEP excerpt cited by the Examiner (MPEP §2172.01) indicates that *omitting* essential matter is not a basis for a §112 ¶2 rejection. Rather, MPEP §2172.01 indicates such omission may be a §112 ¶1 issue. Applicants contend there is no §112 ¶1 issue given the facts of the current appeal, as enablement is satisfied with the Specification's paragraphs [0028]-[0031] explaining how a material may be “chemically inert” yet also be a “reactability increaser.” Specifically, that excerpt cites as a non-limiting example how Ar^+ interacts with TiCl_x . The Specification's paragraph [0030] explains that, while no chemical combination occurs from that interaction, a collision or other association between Ar^+ and the TiCl_x transfers energy from the Ar^+ to the TiCl_x . This energy transfer can result in some form of excitation of the TiCl_x , be it vibrational, rotational, or electronic excitation. (*Id.*) Examples of electronic excitation include merely increasing the potential of a chlorine ion Cl^- to be freed from the TiCl_x to the actual freeing of at least one chlorine ion Cl^- . (*Id.*) As a result, TiCl_4 can become TiCl_3^+ after associating with Ar^+ . (*Id.*) Similarly, action between TiCl_3^+ and Ar^+ can produce TiCl_2^{++} , or perhaps even TiCl^{+++} , and so on. (*Id.*) The Specification's paragraph [0031] adds that, in promoting the formation of charged species from TiCl_4 and promoting even stronger reactivity in already charged species such as TiCl_3^+ and TiCl_2^{++} , the argon promotes a reaction between any of these species and hydrogen.

MPEP §2172.01's “essential matter” concerns are relevant to §112 ¶2 when the claim fails to interrelate – rather than omit – essential elements. Applicants reiterate that the “chemically inert” and “reactability increaser” limitations, when read in light of the Specification (including the excerpts cited above), are sufficiently interrelated.

Thus, binding case precedent, the evidence on record, the Examiner's previous response to such, and the plain language of the MPEP standards provide still further indications that the Examiner has failed to satisfy the burden for a §112 ¶2 rejection of claims 37-39.

C. Rejection of claims under §102

The Examiner rejected claims 37-39 as being anticipated by European Patent No. 0483669 by Akahori. Applicants contend that flaws in the Examiner's rejection demonstrate a failure to satisfy the burden for rejection. Applicants further contend Akahori fails to disclose at least one of the claims' limitations and in fact discloses the opposite.

Concerning the flaws in the Examiner's rejections, the Examiner admitted that the §102 rejection is based upon the Examiner's interpretations articulated in the §112 rejections. (Office Action dated 12/30/04 at p. 3.) Applicants reiterate that the §112 rejections contain at least two definitions of "chemically inert reactivity increaser" and are based upon faulty assumptions and interpretations of the Specification, as discussed above in sections VII(A) and (B) of this Appeal Brief. Applicants contend the flawed bases for the §102 rejection indicate a failure to satisfy Examiner's burden for such a rejection.

Another flaw can be found in the additional reasoning that attempts to support the §102 rejection. Significantly, the Examiner attempts to analogize Akahori's argon to claim 37's "chemically inert reactivity increaser." (Office Action dated 12/30/04 at p. 4.) However, in the next sentence, the Examiner admits that it is Akahori's electrons that increase reactivity. (*Id.* (citing Akahori at p. 5, ln. 38-40).) Indeed, that Akahori excerpt indicates that collision of those electrons enhance reactions. However, that Akahori excerpt does not indicate that the electrons are dissociated from Akahori's argon, as Examiner would have Board believe. Hence, the Examiner's attempt to analogize Akahori's argon to claim 37's "chemically inert reactivity increaser" fails, and the rejection in general fails accordingly.

Moreover, Akahori addresses argon in circumstances wherein alternate properties are in effect. Specifically, Akahori's argon serves to act as a sputterer (Akahori at p. 2, ln. 18; p. 5, ln. 44-45) or a plasma maintainer/stabilizer (*id.* at p. 5, ln. 43; p. 11, ln. 39). Thus, in addressing alternative properties of argon and including the opposing disclosure mentioned above, Akahori is akin to the Chang reference. The Examiner indicated Chang fails to disclose a "chemically inert reactivity increaser" with the withdrawal of the Chang-based §102 rejection. Applicants submit the Board should withdraw the Akahori-based §102 rejections for the same reason.

Applicants also note that the Examiner's final argument suggests that Applicants have provided only one example of a metal film precursor. (Office Action dated 12/30/04 at p. 4.) Once again, Applicants alert the Board that, in general, Applicants should not be understood to be acquiescing to the Examiner's interpretations of the Specification. In particular, Applicants provide other non-limiting examples of such precursors in ¶[0039] of the Specification.

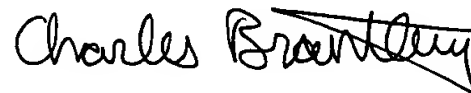
Conclusion

The Examiner's §112 ¶2 rejections suffer from misquotations of the Specification, failure to address previous citations to non-limiting support in the Specification (and the Examiner's previous acceptance thereof), a lack of citation to support in the record, and a misinterpretation of the MPEP. Such flaws indicate the Examiner has failed to meet the burden for a §112 ¶2 rejection. Moreover, the Examiner's previous favorable reaction to the claim limitation at issue indicates the burden for a §112 ¶2 rejection cannot be met.

The Examiner's §102 rejections suffer from the flawed reasoning attempting to support the §112 rejections and a citation to Akahori that contradicts the Examiner's attempted analogy. Such flaws indicate the Examiner has failed to meet the burden for the §102 rejection. Moreover, the Examiner's Akahori citation contradicts the claim limitation at issue; and other Akahori excerpts cite alternatives to the claim limitation at issue. Such disclosure demonstrates the burden for an Akahori-based §102 rejection cannot be met.

Accordingly, Applicants request the Board reverse the Examiner and withdraw the §112 and §102 rejections.

Respectfully submitted,



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Claims Appendix

37. An atmosphere for a chemical vapor deposition process, comprising:
- a deposition gas having a chemical reactivity; and
 - a chemically inert reactivity increaser mixed with said deposition gas.
38. The atmosphere of claim 37 wherein said deposition gas is a film precursor deposition gas.
39. The atmosphere of claim 37 wherein said deposition gas is a metal film precursor deposition gas.

Related Proceedings Appendix

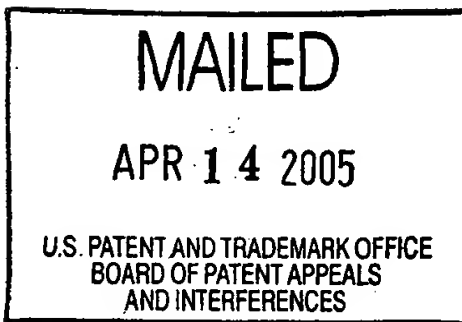
Board decision dated 4/14/05 for U.S. App. Ser. No. 09/825,612



The opinion in support of the decision being entered today was
not written for publication and is not binding precedent of the
Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES



Ex parte SUJIT SHARAN
and
GURTEJ S. SANDHU

Appeal No. 2005-0822
Application No. 09/825,612

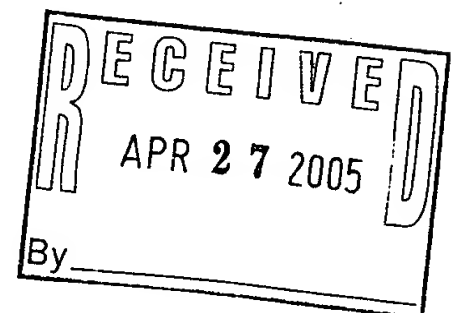
ON BRIEF

Before DELMENDO, JEFFREY T. SMITH, and PAWLIKOWSKI,
Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134
(2004) from the examiner's final rejection of claims 13 through
18, 22 through 26, and 28 (final Office action mailed on Apr. 9,
2003), which are all of the claims pending in the above-
identified application.



The subject matter on appeal relates to: (i) a method of making a semiconductor device (claims 13-18); (ii) a method of performing a "back-end-of-the-line process" (claims 22-26); and (iii) a semiconductor processing method (claim 28). Further details of this appealed subject matter are recited in representative claims 13 through 16, 22, 24, 25, and 28 reproduced below:

13. A method of making a semiconductor device, comprising the steps of:

forming a product in a PECVD^[1] chamber through an interaction of a chemically inert charged species producer gas and a metal-containing compound in a plasma; and

exposing a substrate to said product.

14. The method in claim 13, wherein said step of forming a product comprises forming a product free of constituents of said chemically inert charged species producer gas.

15. The method in claim 14, wherein said step of exposing a substrate to said product further comprises forming a metal layer free of constituents of said chemically inert charged species producer gas.

16. The method in claim 15, wherein said step of forming a product further comprises forming a metal-containing ion of said metal-containing compound.

22. A method of performing a back-end-of-the-line process, comprising:
providing a semiconductor device under

¹ The present specification (§§0003 and 0005) indicates that "PECVD" denotes plasma enhanced chemical vapor deposition.

fabrication;

placing said device in a vacuum chamber;
supplying a metal source gas and a chemically
inert-excitation gas within said vacuum chamber; and
interacting said metal source gas and said
chemically inert-excitation gas.

24. A method of making a semiconductor device
using PECVD comprising:

providing a semiconductor device under
fabrication;

placing said device in a vacuum chamber;
forming combined gasses comprising a metal source
gas with a chemically inert energy-transfer gas;
supplying said combined gases to said vacuum
chamber; and
igniting a plasma.

25. The method in claim 24, wherein said step of
igniting a plasma comprises interacting said combined
gases.

28. A semiconductor processing method comprising
the following steps:

providing a semiconductor wafer;
subjecting said wafer to PECVD conditions in a
chamber;
forming an ionized reactant species by
interacting a metal source material with a chemically
inert collider gas in said chamber; and
forming a metal-containing layer on said wafer
from said ionized reactant species.

The examiner relies on the following prior art references
as evidence of unpatentability:

Chang

6,294,466 B1

Sep. 25, 2001
(filed May 1, 1998)

Richard S. Müller and Theodore I. Kamins, Device Electronics for
Integrated Circuits 102 (John Wiley & Sons 2nd ed. 1986) (Muller).

Claims 13 through 15, 22 through 26, and 28 on appeal stand rejected under 35 U.S.C. § 102(e) as anticipated by Chang.

(Examiner's answer mailed Jan. 13, 2004 at 3-5; final Office action mailed Apr. 9, 2003 at 2-3.)² In addition, claims 16 through 18 on appeal stand rejected under 35 U.S.C. § 102(e) as anticipated by Chang, as evidenced by Muller.³ (Answer at 5.)

We affirm these rejections.⁴

The appellants do not dispute the examiner's factual finding (answer at 3 and 6) that Chang discloses a method for making a semiconductor device comprising forming a product in a PECVD chamber using, inter alia, argon and TiCl₄ and exposing a substrate to the product. (Chang's column 3, lines 2-59.) Nor

² It appears that the examiner inadvertently omitted claims 22-26 and 28 from the statement of the rejection. (See answer at 3 ["Status of Claims" and "Issues" section] and 4-5; final Office action at 2; appeal brief filed on Aug. 20, 2003 at 1-2.)

³ "[E]xtrinsic evidence may be considered when it is used to explain, but not expand, the meaning of a reference." In re Baxter Travenol Laboratories, 952 F.2d 388, 390, 21 USPQ2d 1281, 1284 (Fed. Cir. 1991).

⁴ The appellants state that the appealed claims "do not necessarily fall together" (appeal brief at 2) and provide reasonably specific arguments with respect to certain groups of claims in the "ARGUMENT" section of the appeal brief. Accordingly, we will consider multiple groups of appealed claims to the extent that the appeal brief complies with the requirements of 37 CFR § 1.192(c)(7) (2004) (effective Apr. 21, 1995).

Appeal No. 2005-0822
Application No. 09/825,612

do they challenge the examiner's determination (answer at 6) that Chang's method involves the use of the same materials or reactants under substantially the same or similar conditions as those disclosed in the present specification. Rather, it is the appellants' principal argument that the appealed claims are patentable over Chang because the claims recite certain properties for the gas (e.g., argon) not recognized by Chang. (Appeal brief at 5.) According to the appellants, "merely pointing out the similarity in structure between the claim and prior art" is insufficient to establish that the argon gas used in the prior art method inherently or necessarily possesses the recited characteristics. (Id.) As support for this contention, the appellants rely on the holding in Crown Operations Int'l Ltd. v. Solutia, Inc., 289 F.3d 1367, 1377-78, 62 USPQ2d 1917, 1922-23 (Fed. Cir. 2002). (Id.; reply brief filed on Mar. 18, 2004 at 2.)

The appellants' position is not well taken. The court's decision in Crown was made in the context of patent litigation, where the patent in suit must be accorded a presumption of validity under 35 U.S.C. § 282 that may be overturned only by a showing of clear and convincing evidence. Crown, 289 F.3d at 1377, 62 USPQ2d at 1923. As the appellants may know, the

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evidentiary burden of proving invalidity of an issued patent rests on the party asserting it. Crown, 289 F.3d at 1377-78, 62 USPQ2d at 1923.⁵

No such presumption of validity under 35 U.S.C. § 282 exists in the context of patent prosecution before the United States Patent and Trademark Office (PTO) where a patent has not yet issued. As we noted above, the appellants do not challenge the examiner's factual findings that Chang discloses a method for making a semiconductor device comprising forming a product in a PECVD chamber using, inter alia, argon and TiCl_4 and exposing a substrate to the product under substantially the same or similar conditions as those disclosed in the present specification. In fact, the appellants candidly admit that the present specification identifies argon as an exemplary gas that performs the functions recited in the appealed claims. (Appeal brief at 5.)

Under these circumstances, it was appropriate on the part of the examiner (answer at 6, 11) to shift the burden of proof

⁵ Moreover, the court in Crown found it significant that Crown's inherency argument rested on the assumption that the prior art reference disclosed "the use of TiO_2 , even though it specifie[d] TiO_x , where x is greater than 1.0 but less than 2.0" (emphasis added). Crown, 289 F.3d at 1377, n.2, 62 USPQ2d at 1923, n.2.

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to the appellants to show that the argon in Chang would not inherently or necessarily satisfy the functional limitations recited in appealed claims 13, 22, 24, 25, and 28. Cf. In re Schreiber, 128 F.3d 1473, 1478, 44 USPQ2d 1429, 1432 (Fed. Cir. 1997) ("[C]hoosing to define an element functionally, i.e., by what it does, carries with it a risk...[W]here the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on."); In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990) ("[W]e conclude that the Board correctly found that the virtual identity of monomers and procedures sufficed to support a prima facie case of unpatentability of Spada's polymer latexes for lack of novelty."); see also In re Best, 562 F.2d 1252, 1254-55, 195 USPQ 430, 433-34 (CCPA 1977). That Chang does not fully appreciate the functions (of argon) as recited in the appealed claims is of no moment. MEHL/Biophile Int'l Corp. v. Milgraum, 192 F.3d 1362, 1366, 52 USPQ2d 1303, 1307 (Fed. Cir. 1999) ("Where, as here, the result is a necessary consequence of

what was deliberately intended, it is of no import that the article's authors did not appreciate the results."); In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990) ("It is a general rule that merely discovering and claiming a new benefit of an old process cannot render the process again patentable.").

With respect to appealed claim 16, the appellants contend: "Muller's electrically neutral plasma appears to be in conflict with the ions - electrically charged particles - of claims 16 and 17." (Appeal brief at 6.) This argument lacks merit. As discussed above, the substantial identity in the processes of the applied prior art and the appealed claims supports the examiner's position. The appellants have not discharged their burden of proving that the functions or results recited in the appealed claims would not inherently or necessarily occur in the prior art process. Muller, which the examiner cites for the proposition that a PECVD process is conducted in a closed chamber (answer at 9), merely states that a plasma is "an essentially neutral mixture of excited gaseous species." Furthermore, Chang expressly states that it is well known that a plasma, which is a mixture of ions and gas molecules, is formed by applying energy to process gas. (Column 1, lines 64.) Thus,

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contrary to the appellants' apparent belief, Muller's disclosure is by no means indicative of the absence of ions in Chang's PECVD process.

The appellants point out that "Chang's hydrogen is a plasma-forming gas, with argon included with it as an inert carrier." (Appeal brief at 8.) We note, however, that the appealed claims recite that the charged species producer gas, excitation gas, energy-transfer gas, and collider gas are all "chemically inert." Thus, Chang's disclosure that argon acts as an inert carrier by no means proves that the here recited functions are not inherent or necessarily present in the prior art.

The appellants allege that Chang "does not appear to express applying RF energy to argon." (Appeal brief at 13.) This allegation lacks factual foundation and is in direct conflict with the teachings of Chang. (Column 3, lines 39-43.)

We have considered the appellants' other commentaries in the appeal brief and reply brief but find none of them to be relevant, let alone sufficient to rebut the examiner's prima facie case of anticipation.

For these reasons and those set forth in the answer, we affirm the examiner's rejections under 35 U.S.C. § 102(e) of:

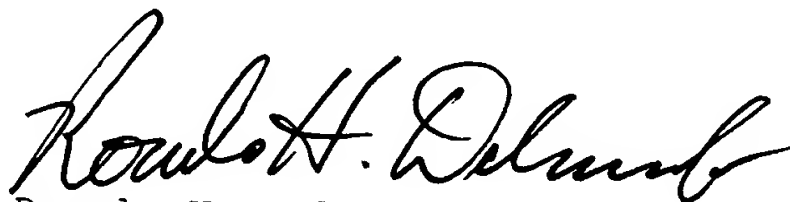
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(i) appealed claims 13 through 15, 22 through 26, and 28 as anticipated by Chang; and (ii) appealed claims 16 through 18 as anticipated by Chang, as evidenced by Muller.

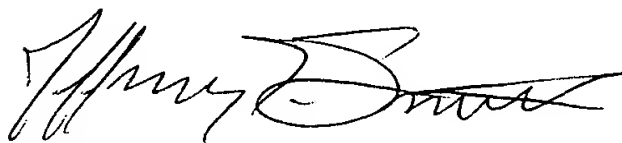
The decision of the examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

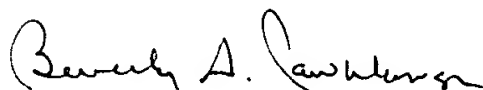
AFFIRMED



Romulo H. Delmendo
Administrative Patent Judge



Jeffrey T. Smith
Administrative Patent Judge



Beverly A. Pawlikowski
Administrative Patent Judge

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) BOARD OF PATENT
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) APPEALS AND
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) INTERFERENCES
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RHD/gjh

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Application No. 09/825,612

CHARLES BRANTLEY II
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Related Proceedings Appendix

Omega Eng'g v. Raytek Corp., 334 F.3d 1314, 67 U.S.P.Q.2d 1321 (Fed. Cir. 2003)



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Omega Engineering Inc.

v.

Raytek Corp.

U.S. Court of Appeals Federal Circuit

Nos. 01-1546, 02-1478

Decided July 7, 2003

United States Patents Quarterly Headnotes

PATENTS**[1] Patent construction -- Claims -- Broad or narrow (§ 125.1303)****Patent construction -- Claims -- Means (§ 125.1307)**

Court construing functional statement in means-plus-function limitation must take great care not to impermissibly limit function by adopting function different from that explicitly recited in claim; in present case, in which claim for sighting system for infrared thermometers requires "means for causing" laser beam to "strike the periphery of the energy zone," there is no basis in specification for adding negative limitation precluding laser beam from striking center or interior of energy zone, since express language of claim does not prohibit laser beam from striking inside energy zone, since negative limitation is not inherent in term "periphery," since directing laser beam inside energy zone would not contradict claim's stated purpose of "visibly outlining said entire energy zone," and since there is no express disclaimer or independent lexicography in written description that would justify adding such negative limitation.

[2] Patent construction -- Prosecution history estoppel (§ 125.09)

Doctrine of prosecution disclaimer does not apply to limit scope of claim unless alleged disavowing action or statement is both so clear as to show reasonable clarity and deliberateness, and so

unmistakable as to be unambiguous evidence of disclaimer; in present case, in which claim for sighting system for infrared thermometers requires "means for causing" laser beam to "strike the periphery of the energy zone," patentee made clear and unmistakable disclaimer of claim scope by insisting that its invention directs energy in manner that does not affect temperature measurement, but patentee did not clearly and unmistakably disavow device that directs laser beam into interior of energy zone.

[3] Infringement -- Literal infringement (§ 120.05)

Summary judgment that accused devices do not infringe claims for sighting system for infrared thermometers that require "means for causing" laser beam to "strike the periphery of the energy zone" must be reversed, since claims, as properly construed, do not prohibit use of "means for causing" that projects laser beam into interior of energy zone, provided it does not add appreciable heat to energy zone, and since parties agree that accused devices project laser beam into energy zone, but triable issue of fact remains as to whether amount of heat added by laser beam affects accuracy of temperature measurement, or is inconsequential.

[4] Patent construction -- Prosecution history estoppel (§ 125.09)**Patent construction -- Claims -- Broad or narrow (§ 125.1303)****Patent construction -- Claims -- Means (§ 125.1307)**

Claims of patent for sighting system for infrared thermometers that require "means for causing" laser beam "to identify and define both the center and only the periphery" of "energy zone" that radiates energy received by thermometer do not require laser beam to strike center and periphery of energy zone sequentially, since claim language is silent as to whether these points must be struck sequentially or simultaneously, and neither word is necessary to performance of claimed function, since

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additional "sequential" limitation has no support in written description, and since patentee's addition of word "only" during prosecution was not unmistakable disclaimer of simultaneity, in that basis for amendment is reasonably susceptible of more than one explanation.

[5] Patent construction -- Prosecution history estoppel (§ 125.09)

Patentee, in prosecuting claims for sighting system for infrared thermometers that require "means for causing" laser beam "to identify and define both the center and only the periphery" of "energy zone" that radiates energy received by thermometer, did not disavow use of central laser beam, or injection of heat into energy zone, since such disclaimers cannot be drawn from patentee's amendment of claims to add term "only," or from vague statements in record relating to such amendment, and since heat injection disclaimer attaching to other claims of patent cannot be imputed to claims at issue, which do not contain same or equivalent terms, and which were not objects of argument giving rise to that disclaimer.

[6] Patent construction -- Claims -- Broad or narrow (§ 125.1303)

Patent construction -- Claims -- Means (§ 125.1307)

Lenses, prisms, and laser beam splitting device are not disclosed structures corresponding to claimed means in claims for sighting system for infrared thermometers, which require "means for causing" laser beam "to identify and define both the center and only the periphery" of "energy zone" that radiates energy received by thermometer, since specification does not clearly associate those structures with claimed function, and since expert declarations purporting to link claimed function with lenses, prisms, and laser splitting device are items of extrinsic evidence that cannot be used to vary plain language of patent document.

[7] Patent construction -- Prosecution history estoppel (§ 125.09)

Prosecution disclaimer arising from disavowals made during prosecution of parent application will attach to continuation-in-part applications, provided same claim limitation is at issue; in present case, continuation-in-part application is not shielded from narrowing disclaimers made during prosecution of its parent application, since there is common claim

term in dispute, since patentee made clear and unmistakable disclaimer of claim scope during prosecution of parent, and since court must presume, unless otherwise compelled, that same claim term in same patent or related patent carries same construed meaning.

PATENTS

Particular patents -- General and mechanical -- Infrared thermometers

5,727,880, Hollander and McKinley, method and apparatus for measuring temperature using infrared techniques, summary judgment of noninfringement reversed.

5,823,678, Hollander and McKinley, light source aiming system and method for hand-held temperature measuring unit, summary judgment of noninfringement reversed.

5,823,679, Hollander and McKinley, method and apparatus for measuring temperature including aiming light, summary judgment of noninfringement and invalidity reversed.

***1322** Appeal from the U.S. District Court for the District of Connecticut, Hall, J.

Action by Omega Engineering Inc. against Raytek Corp., Davis Instrument Manufacturing Co. Inc., Cole-Parmer Instrument Co., and Dwyer Instruments Inc. for patent infringement, consolidated with action by Raytek Corp. against Omega Engineering Inc. and Newport Electronics Inc. Plaintiff Omega Engineering Inc. appeals from summary judgment that none of three patents in suit are infringed, and that one of those patents is invalid for indefiniteness. Reversed and remanded.

Richard G. Greco, of Kaye, Scholer, New York, N.Y.; Peter W. Peterson and Robert Curcio, of DeLio & Peterson, New Haven, Conn., for Omega Engineering Inc.

A. James Isbester, Robert L. Risberg, and Paul Svendsen, of Isbester & Associates, Berkeley, Calif., for Raytek Corp., Davis Instrument Manufacturing Co. Inc., Cole-Parmer Instrument Co., and Dwyer Instruments Inc.

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Before Michel, Clevenger, and Schall, circuit judges.

Clevenger, J.

Omega Engineering, Inc. ("Omega") appeals the grants of summary judgment in favor of Raytek Corporation, Davis Instrument Manufacturing Company, Inc., Cole-Parmer Instrument Company, and Dwyer Instruments, Inc. (collectively "Raytek"). In this appeal involving three consolidated actions, the district court ruled that Raytek did not infringe the asserted claims of U.S. Patents Nos. 5,727,880 (the "'880 patent"), 5,823,678 (the "'678 patent"), and 5,823,679 (the "'679 patent"). Based on its claim construction, the trial court also invalidated claims 33 and 41 of the '679 patent as indefinite. Because the district court *1323 erred in its claim construction of the patents in suit, we reverse and remand.

I

The patents in suit relate to a laser sighting system for use on infrared thermometers. Such sighting systems address a problem particular to the operation of infrared thermometers, which are also called radiometers.

Before the advent of radiometers, mercury thermometers and other traditional means of measuring an object's temperature required physical contact between the sensor and the measured object. In many situations, however, physical contact is difficult or even impossible, such as when the object is a moving piece of machinery in an industrial setting or has a temperature that exceeds the melting point of the sensor.

To address that problem, infrared thermometers can measure a surface's temperature remotely by assessing the amount of heat energy emitted in the form of infrared radiation. The radiometer detects infrared energy through a lens, which receives and directs radiation in the same way that the optics of a telescope receive visible light waves. Like a telescope, the radiometer's lens only detects radiation within its optical "field of view."

Because the radiometer measures temperature by averaging the temperature of all surfaces within its field of view, the optimum temperature measurement occurs when the target area perfectly fills the entire field of view. Under less than optimum conditions, the indicated temperature represents a mixture of object and background temperatures, possibly leading to inaccurate readings. It is therefore important to determine the location of the field of view and the extent to which it encompasses the target area.

Since infrared radiation is not visible to the naked eye, a radiometer user cannot easily determine the size and position of the surface area encompassed by the field of view. Several sighting systems for infrared thermometers have attempted to address that problem. For instance, U.S. Patent No. 4,494,881 issued to Everest ("Everest") illuminates the entire area encompassed by the field of view by directing onto it a beam of incandescent light. Similarly, Japanese Patent No. 62-12848 ("JP 62-12848") uses a plurality of incandescent light beams to identify the target area and its periphery. Other systems, such as the one disclosed by U.S. Patent No. 4,315,150 issued to Darringer ("Darringer"), use a single laser beam directed to the center of the area covered by the field of view.

The patents in suit disclose another sighting system for infrared thermometers. These patents teach methods or devices for using one or more laser beams to visually "outline" or determine "the periphery" of the surface area encompassed by the field of view. That target area within the field of view is known as the "energy zone," which the patents define as the surface area from which emanates 90 percent of the radiated energy received by the radiometer. '880 patent, col. 2, ll. 15-16; '678 patent, col. 2, ll. 25-26; '679 patent, col. 2, ll. 30-31.

The three patents in suit have the same genealogy, originating from an ancestor patent application that matured into U.S. Patent No. 5,368,392 (the "'392 patent"). The oldest patent in suit, the '880 patent, is the grandchild of the '392 patent and discloses a sighting device using at least one laser beam to outline the energy zone. The broadest claim covers:

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1. A laser sighting device for outlining an energy zone to be measured by a radiometer when measuring the temperature of a surface, said device including:

means for projecting at least one laser beam toward said surface; and

means for causing said at least one laser beam to strike the periphery of the energy zone for visibly outlining said entire energy zone.

'880 patent, col. 9, ll. 34-41 (emphases added). Claim 16 covers a laser sighting device to identify the center and periphery of the energy zone:

16. A laser sighting device for identifying and defining the center and periphery of an energy zone to be measured by a radiometer when measuring the temperature of a surface, said device including:

means for projecting project at least one laser beam toward said surface; and

means for causing said at least one laser beam to identify and define both the center and only the periphery of said energy zone. Id., col. 10, ll. 24-33 (emphases added). All of the asserted claims of this patent (claims 1, 3, *1324 16 and 18) are concededly written in means-plus-function format.

As a continuation in part of the '880 patent, the '678 patent claims methods and devices using more than two laser beams to outline the energy zone. Claim 1 of the '678 patent states:

1. A method *for outlining* an energy zone on a surface whose temperature is to be measured using the combination of a radiometer and a laser aiming device, said method *comprising* the steps of providing said laser device associated with said radiometer, and causing said device to emit simultaneously a plurality of more than two laser beams towards said surface to strike said surface at individual mutually spaced locations *to outline* said energy zone.

'678 patent, col. 10, ll. 55-62 (emphases added).

Although it issued on the same day as the '678 patent, the '679 patent is in fact a continuation in part of the '678 patent and teaches the use of at least three laser beams to outline the energy zone. The broadest independent claim of the '679 patent covers:

1. A method *for outlining* an energy zone on a surface whose temperature is to be measured using the combination of a temperature measurement device and a laser sighting device, said method *comprising* the steps of providing a laser sighting device associated with said temperature measurement device and causing said laser device to emit a plurality of at least three laser beams toward said surface to strike said surface simultaneously at mutually spaced locations serving *to outline* said energy zone.

'679 patent, col. 12, l. 64 - col. 13, l. 5 (emphases added).

Omega asserted infringement of all three patents by Raytek's MX and ST series devices. The MX models use a diffraction device to divide a laser beam into sixteen separate beams, fifteen of which are directed to the periphery of the energy zone while the sixteenth beam is directed to the center of the zone. Similarly, the ST models use a diffraction device or beam splitter to divide a laser beam into multiple beams projecting around the energy zone, with one beam directed into the center of the energy zone. In its pleadings, Omega asserted that the MX and ST devices infringed claims 1, 3, 16 and 18 of the '880 patent; all of the claims of the '678 patent except claim 5; and claims 1 to 53 of the '679 patent.

In resolving the parties' claim construction disputes, the district court interpreted the phrases "to outline the energy zone," "outline visibly" the energy zone, "to outline visibly the periphery," and equivalent phrases in the asserted claims of the '678 and '679 patents as excluding a laser beam directed inside the energy zone. The trial court also interpreted "means for causing" in claim 1 of the '880 patent as projecting a laser beam toward the surface but not encompassing any "light striking the center or interior portion of the energy zone." In the

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same vein, the court read claim 16 of the '880 patent as precluding the simultaneous identification of the center and periphery of the energy zone by the "means for causing."

Based on its construction of the claims and the undisputed fact that the accused devices have a laser beam directed to the center of the energy zone, the district court granted summary judgment of noninfringement in Raytek's favor. In the alternative, the trial court also granted summary judgment invalidating claims 33 and 41 of the '679 patent for indefiniteness, because claims 33 and 41 explicitly require a central laser beam while being dependent on claims construed to exclude any laser beam directed inside the energy zone. Omega timely appealed, vesting us with jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II

We review the grant of summary judgment de novo, without deference to the district court's determinations. *IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1429, 54 USPQ2d 1129, 1133 (Fed. Cir. 2000). We therefore reapply the standard set forth in Rule 56 of the Federal Rules of Civil Procedure. *Suntiger, Inc. v. Scientific Research Funding Group*, 189 F.3d 1327, 1334, 51 USPQ2d 1811, 1815 (Fed. Cir. 1999).

A motion for summary judgment shall be granted where "there is no genuine issue as to any material fact and . . . the moving party is entitled to a judgment as a matter of law." Fed. R. Civ. P. 56(c). Summary judgment is therefore appropriate when there is no genuine issue of material fact or when, drawing all factual inferences in favor of the nonmoving party, no "reasonable jury could return a verdict *1325 for the nonmoving party." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986). The party opposing the motion cannot rest on the mere allegations or denials of his pleading, but must "go beyond the pleadings and by her own affidavits, or by the 'depositions, answers to interrogatories, and admissions on file' designate 'specific facts showing that there is a genuine issue for trial.'" *Celotex Corp. v. Catrett*, 477 U.S. 317, 324 (1986) (citation omitted). Material facts are those which

"might affect the outcome of the suit under the governing law." *Anderson*, 477 U.S. at 248. Any doubt as to the existence of any issue of material fact requires denial of the motion. *Id.*

A determination of infringement involves a two-step analysis. "First, the claim must be properly construed to determine its scope and meaning. Second, the claim as properly construed must be compared to the accused device or process." *Carroll Touch, Inc. v. Electro Mech. Sys., Inc.*, 15 F.3d 1573, 1576, 27 USPQ2d 1836, 1839 (Fed. Cir. 1993). We review the first step, determining the meaning and scope of the patent claims, as a matter of law, without deference to the trial court. *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1456, 46 USPQ2d 1169, 1174 (Fed. Cir. 1998) (en banc). The second step, comparing the properly construed claims to the accused device, is a question of fact. *Bai v. L & L Wings, Inc.*, 160 F.3d 1350, 1353, 48 USPQ2d 1674, 1676 (Fed. Cir. 1998).

As mandated by the definiteness requirement of the Patent Act, a specification must conclude with claims "particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2 (2000). Determining whether a claim is definite requires an analysis of "whether one skilled in the art would understand the bounds of the claim when read in light of the specification If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, § 112 demands no more." *Miles Labs., Inc. v. Shandon, Inc.*, 997 F.2d 870, 875, 27 USPQ2d 1123, 1126 (Fed. Cir. 1993). We conduct that analysis de novo, because "[a] determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims." *Personalized Media Communications, LLC v. Int'l Trade Comm'n*, 161 F.3d 696, 705, 48 USPQ2d 1880, 1888 (Fed. Cir. 1998).

III

Turning first to the summary judgment that claims 1 and 3 of the '880 patent were not infringed, we commence our plenary review of that ruling by

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determining the proper scope of the claims at issue. *TurboCare Div. of Demag Delaval Turbomachinery Corp. v. Gen. Elec. Co.*, 264 F.3d 1111, 1120, 60 USPQ2d 1017, 1024 (Fed. Cir. 2001).

Claims 1 and 3 of the '880 patent require a "means for causing said at least one laser beam to strike the periphery of the energy zone for visibly outlining said entire energy zone." The parties agree that those claims at issue are in means-plus-function format and therefore invoke the provisions of 35 U.S.C. § 112, ¶ 6. *See Wenger Mfg., Inc. v. Coating Mach. Sys., Inc.*, 239 F.3d 1225, 1232, 57 USPQ2d 1679, 1684 (Fed. Cir. 2001) (holding that claim limitation using the term "means for" and not reciting any structure presumptively falls within the scope of § 112, ¶ 6).

Section 112, paragraph 6, allows a patentee to recite a function to be performed as a claim limitation rather than reciting structure or materials for performing that function. 35 U.S.C. § 112, ¶ 6 (2000). The construction of a means-plus-function limitation follows a two-step approach. First, we must identify the claimed function, *Micro Chem., Inc. v. Great Plains Chem. Co., Inc.*, 194 F.3d 1250, 1258, 52 USPQ2d 1258, 1263 (Fed. Cir. 1999), staying true to the claim language and the limitations expressly recited by the claims. *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 296 F.3d 1106, 1113, 63 USPQ2d 1725, 1730 (Fed. Cir. 2002). Once the functions performed by the claimed means are identified, we must then ascertain the corresponding structures in the written description that perform those functions. *Id.* A disclosed structure is corresponding "only if the specification or the prosecution history clearly links or associates that structure to the function recited in the claim." *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424, 43 USPQ2d 1896, 1900 (Fed. Cir. 1997). In other words, the structure must be necessary to perform the claimed function. *Northrop Grumman Corp. v. Intel Corp.*, 325 F.3d 1346, 1352, 66 USPQ2d 1341, 1345 (Fed. Cir. 2003).

*1326 A

At the threshold, the parties disagree on the proper

function performed by the "means for causing" in claims 1 and 3 of the '880 patent. According to the text of claim 1, on which claim 3 is dependent, the "means" causes "at least one laser beam to strike the *periphery* of the energy zone *for visibly outlining* said entire energy zone." '880 patent, col. 9, ll. 39-41 (emphases added). The district court construed the phrase "strike the periphery . . . for visibly outlining" in the claims' function as encompassing the "projection of the laser light toward the surface, but does not encompass light striking the center or interior portion of the energy zone." In reaching that interpretation, the trial court reasoned that the language of claims 1 and 3 requires the laser beam to only strike the periphery of the energy zone. To buttress that decision, the district court indicated that permitting the laser beam to strike the center of the energy zone would be contrary to the claim's purpose of visibly outlining the energy zone and contradict an express element of the claim. However, neither the reasons provided by the district court nor our plenary review of the intrinsic evidence support that claim interpretation.

[1] "When construing the functional statement in a means-plus-function limitation, we must take great care not to impermissibly limit the function by adopting a function different from that explicitly recited in the claim." *Generation II Orthotics, Inc. v. Med. Tech., Inc.*, 263 F.3d 1356, 1364-65, 59 USPQ2d 1919, 1926 (Fed. Cir. 2001). Despite that admonition, the trial court's ruling incorporated into the claim language a novel negative limitation, precluding the laser beam affected by the "means for causing" from striking the center or the interior of the energy zone. As construed by the district court, claims 1 and 3 now encompass a "means for causing said at least one laser beam to strike the periphery of the energy zone, *but not strike the center or interior portion of the energy zone*, for visibly outlining said entire energy zone."

This additional negative limitation finds no anchor in the explicit claim language. The express text of the claims does not prohibit the laser beam from striking inside the energy zone. The claims' wording

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only calls for the laser beam to "strike the periphery of the energy zone for visibly outlining said entire energy zone." '880 patent, col. 9, ll. 39-41. The phrase added by the district court finds no support in the text of the claims.

Nor is that negative limitation inherent in the term "periphery," as believed by the district court and argued by Raytek. The term's ordinary and customary meaning as discernible from dictionary evidence, *see Schumer v. Lab. Computer Sys., Inc.*, 308 F.3d 1304, 1311, 64 USPQ2d 1832, 1838 (Fed. Cir. 2002) ("The proper approach is to construe the claim language using standard dictionary definitions, because here, the claims have no specialized meaning."), is "the perimeter of a circle, ellipse, or other closed curvilinear figure." *Webster's Third New Int'l Dictionary* 1681 (1993). That definition does not necessitate the addition of a negative limitation, since nothing in the term's denotation precludes the laser beam from striking inside the energy zone's perimeter. The plain words of the claims merely require that the laser beam strike the periphery of that zone.

In the same vein, we do not agree with the trial court that directing light inside the energy zone would contradict the claim's stated purpose of "visibly outlining said entire energy zone." The inherent contradiction identified by the district court exists only because it assumed that a laser beam directed inside the energy zone cannot at the same time outline that zone. That assumption, in turn, supposes two facts: (1) the claimed invention only has one laser beam, and (2) the sole laser beam is incapable of outlining while striking the inside of the energy zone at the same moment. The plain words of the claims belie the first supposition, since the claims permissively call for "at least one laser beam." '880 patent, col. 9, l. 39 (emphasis added). The phrase "at least one" indicates that the "means for causing" does not necessarily act on only one laser beam. *See Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345, 51 USPQ2d 1377, 1379 (Fed. Cir. 1999) ("Use of the phrase 'at least one' means that there could be only one or more than one."). The second supposition is equally flawed, because the claims only require that the laser beam strike the

periphery to outline the energy zone. In other words, striking the inside of the energy zone is not a requirement of the plain claim language, avoiding the necessity of the laser beam being both outside and inside the energy zone at the same time. Consequently, with both suppositions put to *1327 rest, the assumption made by the district court can no longer stand, exposing the alleged contradiction as a mere illusion.

Beyond the words of the claim, neither the district court nor Raytek has identified any express disclaimer or independent lexicography in the written description that would justify adding that negative limitation. *See CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366-67, 62 USPQ2d 1658, 1662-63 (Fed. Cir. 2002). Our independent review of the patent document, *see Bell Atl. Network Servs., Inc. v. Covad Communications Group, Inc.*, 262 F.3d 1258, 1266, 59 USPQ2d 1865, 1869 (Fed. Cir. 2001), reveals no express intent to confer on the claim language the novel meaning imparted by this negative limitation. Accordingly, we must conclude that there is no basis in the patent specification for adding the negative limitation.

B

We indulge a "heavy presumption" that claim terms carry their full ordinary and customary meaning, *CCS Fitness*, 288 F.3d at 1366, 62 USPQ2d at 1662, unless the patentee unequivocally imparted a novel meaning to those terms or expressly relinquished claim scope during prosecution, *see Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325-26, 63 USPQ2d 1374, 1380-81 (Fed. Cir. 2002). Raytek urges us to disregard that strong presumption and to condone the added negative limitation based on Omega's alleged disclaimer of the use of a central laser beam during the patent prosecution. *See Cybor Corp.*, 138 F.3d at 1457, 46 USPQ2d at 1175 (stating that a patent's prosecution history "is relevant to the construction of a claim written in means-plus-function form"). Omega of course disagrees. On the facts of this case, Omega's prosecution disclaimer is more circumscribed than Raytek asserts.

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The doctrine of prosecution disclaimer is well established in Supreme Court precedent, precluding patentees from recapturing through claim interpretation specific meanings disclaimed during prosecution. See *Schriber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211, 220-21 (1940) ("It is a rule of patent construction consistently observed that a claim in a patent as allowed must be read and interpreted with reference to claims that have been cancelled or rejected, and the claims allowed cannot by construction be read to cover what was thus eliminated from the patent."); *Crawford v. Heysinger*, 123 U.S. 589, 602-04 (1887); *Goodyear Dental Vulcanite Co. v. Davis*, 102 U.S. 222, 227 (1880); cf. *Graham v. John Deere Co.*, 383 U.S. 1, 33 [148 USPQ 459] (1966) (ruling, in addressing the invalidity of the patents in suit, that "claims that have been narrowed in order to obtain the issuance of a patent by distinguishing the prior art cannot be sustained to cover that which was previously by limitation eliminated from the patent").

In light of the Court's guidance, we have adopted that doctrine as a fundamental precept in our claim construction jurisprudence. See *Tex. Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1204, 64 USPQ2d 1812, 1819 (Fed. Cir. 2002); *Hockerson-Halberstadt, Inc. v. Avia Group Int'l, Inc.*, 222 F.3d 951, 956, 55 USPQ2d 1487, 1491 (Fed. Cir. 2000); *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576-77, 34 USPQ2d 1673, 1676-77 (Fed. Cir. 1995); *Biodex Corp. v. Loredan Biomedical, Inc.*, 946 F.2d 850, 863, 20 USPQ2d 1252, 1262 (Fed. Cir. 1991); *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452, 227 USPQ 293, 296 (Fed. Cir. 1985) (ruling that "the prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance"); *McGill Inc. v. John Zink Co.*, 736 F.2d 666, 673, 221 USPQ 944, 949 (Fed. Cir. 1984). As a basic principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public's reliance on definitive statements made during prosecution. See *Digital Biometrics, Inc. v. Identix, Inc.*, 149 F.3d 1335, 1347, 47 USPQ2d

1418, 1427 (Fed. Cir. 1998).

We have, however, declined to apply the doctrine of prosecution disclaimer where the alleged disavowal of claim scope is ambiguous. For instance, in *Northern Telecom Ltd. v. Samsung Electronics Company*, 215 F.3d 1281, 1293-95, 55 USPQ2d 1065, 1074-75 (Fed. Cir. 2000), the accused infringer relied on remarks made by the inventors to overcome a rejection as the basis for narrowing the broad language of the claims. Having independently considered the prosecution history, we viewed the inventors' statements as amenable to multiple reasonable interpretations *1328 and deemed the remarks so ambiguous that, "[l]ike the district court, we simply cannot tell." *Id.* at 1294, 55 USPQ2d at 1075. Since the prosecution statements were "far too slender a reed to support the judicial narrowing of a clear claim term," we declined to apply the doctrine of prosecution disclaimer under those circumstances. *Id.*; see also *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1347, 60 USPQ2d 1851, 1858 (Fed. Cir. 2001) (refusing to limit the ordinary meaning of the claim because the alleged disclaimer in the file wrapper was at best "inconclusive"); *Pall Corp. v. PTI Techs. Inc.*, 259 F.3d 1383, 1393-94, 59 USPQ2d 1763, 1770 (Fed. Cir. 2001) (finding that the scope of disclaimer over the prior art reference was ambiguous and thus remanding for clarification), *vacated on other grounds*, 535 U.S. 1109 (2002); *DeMarini Sports, Inc. v. Worth, Inc.*, 239 F.3d 1314, 1326-27, 57 USPQ2d 1889, 1895-96 (Fed. Cir. 2001) (refusing to rely on ambiguity surrounding examiner's silence or patentee's lack of argument during prosecution to construe claim term); *Vanguard Prods. Corp. v. Parker Hannifin Corp.*, 234 F.3d 1370, 1372, 57 USPQ2d 1087, 1089 (Fed. Cir. 2000) (refusing to narrow the asserted claim based on prosecution disclaimer because "the prosecution history does not support [the infringer's] argument that the Vanguard inventors 'expressly disclaimed' claim scope beyond products made by co-extrusion"); *Serrano v. Telular Corp.*, 111 F.3d 1578, 1584, 42 USPQ2d 1538, 1542-43 (Fed. Cir. 1997); cf. *Spectrum Int'l, Inc. v. Sterilite Corp.*, 164 F.3d 1372, 1378, 49 USPQ2d 1065, 1068-69 (Fed. Cir. 1998) (noting that "explicit statements made by a

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patent applicant during prosecution to distinguish a claimed invention over prior art may serve to narrow the scope of a claim").

But where the patentee has unequivocally disavowed a certain meaning to obtain his patent, the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender. For example, in *Rheox, Inc. v. Entact, Inc.*, 276 F.3d 1319, 1325, 61 USPQ2d 1368, 1373 (Fed. Cir. 2002), we ruled that the scope of the patent in suit did not cover "triple superphosphate"--an embodiment expressly disclosed in the written description--because the patentee cancelled a claim covering "triple superphosphate" and expressly disclaimed that compound in his arguments to the examiner to gain patent allowance. *Id.* We reached a similar conclusion in *Ballard Medical Products v. Allegiance Healthcare Corporation*, 268 F.3d 1352, 1359-62, 60 USPQ2d 1493, 1499-1501 (Fed. Cir. 2001), which involved means-plus-function claims. There, the patentee asserted that the accused devices were equivalents, under paragraph 6 of section 112, to the claimed function's corresponding structure. *Id.* at 1359, 60 USPQ2d at 1499. We rejected that assertion on the basis of prosecution disclaimer:

When a patentee advises the examiner (and the public after patent issuance) that a particular structure is not within his invention, the patentee is not permitted to assert in a subsequent infringement action that the same structure is equivalent to the structure described in the patentee's specification for purposes of section 112 paragraph 6. *Id.* Based on the clear disavowal found in the file wrapper, we concluded that the accused device did not include an equivalent to the claimed function's corresponding structure. *Id.* at 1362, 60 USPQ2d at 1501; see also *Bell Atl. Network*, 262 F.3d at 1273-75, 59 USPQ2d at 1874-76 (relying on prosecution history to limit claimed "transceiver" to the three stated modes, because of clearly limiting statements made by the patentee to the examiner to overcome a prior art rejection); *Day Int'l, Inc. v. Reeves Bros., Inc.*, 260 F.3d 1343, 1349, 59 USPQ2d 1790, 1794 (Fed. Cir. 2001) (holding that

the patentee had disavowed curing done at the higher conventional curing temperatures, because of representations to the patent examiner that the prior art curing temperatures were too high and because of the numerous references to a "low temperature cure" or "low temperature vulcanization" throughout the file wrapper); *Southwall*, 54 F.3d at 1576-77, 34 USPQ2d at 1677 (holding that the limitation "sputter-deposited dielectric" excluded a two-step process, because the patentee argued during prosecution that the metal oxide in the process was "directly deposited" and that the invention thus only covered a one-step process).

[2] To balance the importance of public notice and the right of patentees to seek broad patent coverage, we have thus consistently rejected prosecution statements too vague or ambiguous to qualify as a disavowal of claim scope. *E.g.*, *Schwing GmbH v. Putzmeister Aktiengesellschaft*, 305 F.3d 1318, 1324-25, 64 *1329 USPQ2d 1641, 1645 (Fed. Cir. 2002) ("[P]rosecution history . . . cannot be used to limit the scope of a claim unless the applicant took a position before the PTO that would lead a competitor to believe that the applicant had disavowed coverage of the relevant subject matter."); *DeMarini Sports*, 239 F.3d at 1326-27, 57 USPQ2d at 1896. Rather, we have required the alleged disavowing statements to be both so clear as to show reasonable clarity and deliberateness, *N. Telecom*, 215 F.3d at 1294-95, 55 USPQ2d at 1075 (declining to apply doctrine because the infringer had not shown "that the patentees--with reasonable clarity and deliberateness--defined 'plasma etching' as excluding ion bombardment" (citation omitted)), and so unmistakable as to be unambiguous evidence of disclaimer. *E.g.*, *Storage Tech. Corp. v. Cisco Sys. Inc.*, 329 F.3d 823, 833, 66 USPQ2d 1545, 1552 (Fed. Cir. 2003) ("We therefore do not consider the applicants' statement to be a clear and unambiguous disavowal of claim scope as required to depart from the meaning of the term provided by the written description."); *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327 F.3d 1364, 1369, 66 USPQ2d 1631, 1634 (Fed. Cir. 2003) ("The prosecution history does not show any clear and unambiguous disavowal of steps in

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advance of the step of growing *E. coli* cells in the claimed temperature range."). Consequently, for prosecution disclaimer to attach, our precedent requires that the alleged disavowing actions or statements made during prosecution be both clear and unmistakable. [FN1]

In this case, the prosecution history indicates that a clear and unmistakable disclaimer occurred regarding the term "to visibly outline" in the claimed function, but not one as broad as Raytek urges. During the prosecution of the '880 application, the examiner rejected as obvious some of the filed claims based on a combination of three prior art references: (1) the Everest reference, which used incoherent incandescent light to illuminate the entire energy zone; (2) the JP 62-12848 reference, which used multiple incandescent light sources to identify the energy zone; and (3) the Darringer reference, which used a single laser beam to identify the center of the energy zone. Instead of amending the claim in response to the rejection, the patentee attempted to overcome the prior art by proffering a narrower meaning of the function performed by the "means for causing."

To overcome the combination of Everest and Darringer, Omega argued that Everest, alone or with Darringer, would add detectable heat to the energy zone and thus affect the accuracy of the temperature measurements. As the patentee explained:

The advantage offered by the invention of claim 1, amended, is that it provides a laser sighting device that relies on the use of at least one laser beam that is able to *outline* the energy zone on the surface to be measured rather than illuminate the entire zone. The clear advantage offered by such a device is that it only directs energy at the edge of the energy zone to be measured to outline same and, as such, has virtually no effect on the temperature measurement to be taken. Such a concept is neither taught nor suggested in either Everest or Darringer et al., taken alone or in combination.

As this passage shows, Omega did not clearly and unmistakably disavow a device that directs light

into the interior of the energy zone, contrary to the construction adopted by the trial court and urged by Raytek. Stated otherwise, the patentee did not deliberately and unambiguously define its invention as a device whose laser beams would remain outside of the energy zone. Rather, the patentee distinguished the prior art by clearly stating that its device would have "virtually no effect on the temperature measurement to be taken" when it outlines the energy zone. In drawing that distinction, Omega put the examiner and the public on notice of the invention's crucial feature: The invention would not add appreciable heat to the energy zone.

Were that passage the sole statement in the prosecution history, the disclaimer might not rise to the requisite level of being unmistakable. In this case, however, Omega strengthened its disavowal in response to the examiner's *1330 obviousness rejection based on the substitution of laser beams for JP 62-12848's incandescent lamps. To overcome that rejection, the patentee emphasized that:

When such a [sic] incoherent beam is projected parallel and in close proximity to the outside boundaries of the invisible IR cone, a portion of the incoherent beam would diffuse towards the inside of the energy cone [sic]. The diffused portion of light inside the cone will hit the target energy zone in the form of heat energy and will be reflected back to the IR detector giving an erroneous temperature reading . . . [A] laser produces a coherent beam whereas an incandescent lamp produces incoherent light. Since the laser can project a well-defined beam of light, it may be used to define an IR heat zone accurately without infusing energy into the IR cone.

Again, the patentee's arguments did not focus on the projected laser beams remaining outside of the energy zone. Instead, Omega's concerns concentrated on how the coherent beams in its invention would "define an IR heat zone accurately without infusing energy into the IR cone." By avoiding the addition of heat into the energy zone, the patented device would provide a more accurate temperature reading.

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Omega reiterated this point again in response to the rejection based on the combination of JP 62-12848 and Darringer. To overcome that rejection, the patentee argued that the lamps in JP 62-12848 were not, and could not be, laser beams. In essence, Omega distinguished JP 62-12848 on the basis that its incandescent lamps would allow heat to diffuse into the energy zone and affect temperature readings. Turning to Darringer, the patentee asserted that the reference did not teach or suggest the "means for causing said at least one laser beam to outline said energy zone." In other words, Darringer only projected a single laser beam into the center of the energy zone. When combined, Darringer and JP 62-12848 would compound the problem. For that reason, Omega affirmed that "the simple substitution of a laser beam for an incandescent light source is not, as maintained by the Examiner, an obvious substitution but offers far superior results."

Consequently, during the prosecution of the application that issued as the '880 patents, Omega repeatedly insisted that its invention differed from the prior art by precluding appreciable heat from entering the energy zone and affecting the temperature of the energy zone. By insisting that its invention directs energy in a way that does not affect temperature measurement, the patentee has rejected the examiner's broad assessment of the claim scope and stated in a public record what his invention could not be. That statement is a deliberate surrender of claim scope, unmistakable in its effect because it is not suitable to multiple interpretations as in *Northern Telecom*, 215 F.3d at 1294, 55 USPQ2d at 1075. There is only one possible interpretation of this clear statement: The inventions covered by claims 1 and 3 have significantly reduced effect on temperature measurement.

Since the patentee offered a narrower construction of the verb "to visibly outline" in the disputed function, it has clearly and unmistakably disclaimed the territory between the full ordinary meaning of the claim language and the asserted new meaning. The claimed function, as stated in claims 1 and 3, must not add appreciable heat to the energy zone as

to affect the accuracy of the temperature measurement. The district court was therefore correct in finding prosecution disclaimer, but erred in ascertaining the scope of the disavowal. *See* Part III.A., *supra*.

In sum, based on our consideration of the district court's analysis and our plenary review of the intrinsic evidence, we cannot agree with the trial court's interpretation of the function performed by the "means for causing." There is no support in the specification or the prosecution history for the district court's negative limitation that would preclude the projection of light into the interior or the center of the energy zone. Rather, we must give the claim language its presumptive full ordinary meaning, limited solely by the patentee's clear and unmistakable disclaimer. Therefore, we conclude that the claimed function is the causing of at least one laser beam to strike the periphery of the energy zone for visibly outlining the entire energy zone, without adding appreciable heat to the energy zone as to affect the accuracy of the temperature measurement.

C

Having determined the function performed by the "means for causing," we must now ascertain the corresponding structures which perform those functions. *1331 *Cardiac Pacemakers*, 296 F.3d at 1113, 63 USPQ2d at 1730. A corresponding structure must be clearly linked to the claimed function. *B. Braun Med.*, 124 F.3d at 1424-25, 43 USPQ2d at 1900.

The specification of the '880 patent discloses numerous corresponding structures, clearly linked to the claimed function by statements such as "direct the laser beam about the perimeter of the energy zone," '880 patent, col. 6, ll. 25-26, or "thereby permitting the laser beam 114 to rotate about the periphery of the energy zone E to make it visible to the user of the radiometer 10," *id.*, col. 6, ll. 49-51.

Guided by those "clearly linking" statements, we have associated the following disclosed structures to the "means for causing," and list them according

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to the corresponding figures discussed in the specification. Figures 2 and 3 depict the use of the motive means, *id.*, col. 6, ll. 9-11 and 45, the vibratory means, or the application of a magnetic field, *id.*, col. 6, ll. 13-15 and 46-47, to rotate the laser beam. Figure 4 also shows a magnetic field applied to rotate the laser beam around the periphery of the energy zone. *Id.*, col. 6, ll. 53-59. In the embodiment shown in figure 6, a combination of a pivot bearing, connecting arm and attached motor rotates the laser beam, *id.*, col. 7, ll. 7-10, while optical fibers effect the desired function in the embodiment of figures 7 and 10, *id.*, col. 7, ll. 14-20 and 41-49. A combination of a rotating flat mirror and motor performs that function in the embodiment of figure 8, *id.*, col. 7, ll. 24-29, whereas an arrangement of motor, slip rings, counterweights, screw adjustments and pivot point produces the desired effect in the embodiment shown in figures 11 and 12, *id.*, col. 7, l. 50 - col. 8, l. 15 and col. 8, ll. 26-36. Finally, the text discussing figure 13 describes a combination of motor, slider, swivel ball and swivel seat as the corresponding structures. *Id.*, col. 8, ll. 52-62.

D

Having construed the disputed claims, we must now ascertain whether the district court properly granted summary judgment of noninfringement of claims 1 and 3 of the '880 patent. On that point, we must answer in the negative.

[3] Indeed, triable issues of fact, not amenable to appellate determination on first instance, remain in this case. As a question of fact, literal infringement of a § 112, ¶ 6 limitation requires that the relevant structure in the accused device perform the identical function recited in the claim and be identical or equivalent to the corresponding structure in the specification. [FN2] *Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1268- 69, 51 USPQ2d 1225, 1229-31 (Fed. Cir. 1999). Functional identity and either structural identity or equivalence are both necessary. *Id.*, 51 USPQ2d at 1229- 30. Because we have rectified the district court's construction of the claimed function and clarified the corresponding structures, the summary judgment

of noninfringement cannot stand since the conclusion regarding the lack of functional identity is no longer necessarily true. Under the correct construction of its function, the "means for causing" is no longer prohibited from projecting its laser beams into the interior of the energy zone; it must only avoid adding appreciable heat to the energy zone as to affect the accuracy of the temperature measurement.

In this case, the parties agree that the accused devices project a single laser beam into the center of the energy zone, but dispute whether that laser beam adds any appreciable heat to the zone. In fact, in response to Raytek's motion for summary judgment, Omega proffered two expert declarations, both asserting that any heat added by a central laser was inconsequential and did not affect the temperature reading. Because a reasonable jury might reach different conclusions when faced with this evidence, we must conclude that a triable issue of fact remains in this case and must therefore reverse the summary judgment of noninfringement of claims 1 and 3 of the '880 patent.

IV

We now turn to the summary judgment that claims 16 and 18 of the '880 patent were not infringed. Claim 16, on which claim 18 is dependent, calls for a "means for causing said at least one laser beam to identify and define both the center and only the periphery of said energy zone," and the parties agree that those claims fall within the ambit of § 112, ¶ 6.

*1332 A

Because these claims are in means-plus-function format, we commence our plenary review by addressing the district court's construction of the claims' function. *Micro Chem.*, 194 F.3d at 1258, 52 USPQ2d at 1263. Faced with the requirement that the laser beam strikes both the periphery and the center of the energy zone, the trial court rejected the possibility that the laser could simultaneously define and identify the center and the periphery of the energy zone. Instead, the district court required that the laser beam strike those points sequentially. We cannot agree.

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It is axiomatic that, unless expressly compelled by the intrinsic evidence, courts must avoid the addition of a novel limitation. *See Wenger Mfg.*, 239 F.3d at 1233, 57 USPQ2d at 1684 ("Under § 112, ¶ 6, a court may not import functional limitations that are not recited in the claim, or structural limitations from the written description that are unnecessary to perform the claimed function."). In reaching its interpretation of claims 16 and 18, the district court improperly imposed an additional limitation that has no support in the wordings of the claims, the written description or the prosecution history.

[4] Indeed, the text of the claims themselves does not substantiate that construction. Claims 16 and 18 differ from claims 1 and 3 by requiring that, in addition to striking the periphery of the energy zone, the laser beam must also identify the zone's center. *Compare* '880 patent, col. 9, ll. 39-41, *with id.*, col. 10, ll. 31-33. The claims' language is, however, silent on whether the laser beam must strike the center and the periphery either sequentially or simultaneously. And neither word is necessary to the performance of the claimed function. There is thus no basis in the text of the claims for adding a new limitation, be it the adjective "simultaneous" or "sequential."

The district court justified the addition of the "sequential" limitation by reference to two preferred embodiments in the written description. Specifically, the trial court determined the function by first searching for the corresponding structures, finding those structures in figures 11 and 12. We find that justification inadequate, because such a reasoning turns our rule of construction for means-plus-function claims upside down. The district court's approach essentially starts with a structure, and defines the function in light of that structure. Our case law, however, requires the exact opposite procedure: In construing means-plus-function claims, courts must first identify the claimed function using traditional tools of claim construction and then determine the structure corresponding to the identified function. *See Micro Chem.*, 194 F.3d at 1258, 52 USPQ2d at 1263. Consequently, the additional limitation has no

support in the patent's specification.

Nor does the prosecution history validate that ruling. According to the district court and Raytek, the addition of the word "only" before "the periphery" during the prosecution of the '880 patent indicated "the concept that the energy field was not to be the target of the laser beam, but merely the periphery." In other words, the trial court read the addition of the term "only" as tantamount to a disclaimer of simultaneity. This alleged prosecution disclaimer does not, however, rise to the level of being unmistakable. Although Omega added the word "only" by amendment to overcome the Everest and JP 62- 12848 references cited by the examiner, the basis for that amendment is reasonably amenable to more than one explanation. Perhaps, as Omega suggests, the patentee made the amendment to prevent the projected light from illuminating the entire energy zone, as taught by Everest and JP 62-12848, by requiring a space between the central laser beam and the laser striking the periphery. Or it could be any number of other unstated but reasonable rationales unrelated to the issue of simultaneity. As in *Northern Telecom*, there is more than one reasonable basis for the amendment, rendering the intent underlying the amendment ambiguous and thus negating the possibility of the disclaimer being unmistakable. Consequently, there is no ground for adding a "sequential" limitation or for excluding the concept of simultaneity.

In sum, we reject the imposition of a "sequential" limitation to the function of claims 16 and 18, because that restriction finds no support in the intrinsic evidence. Given its full ordinary meaning, the laser beam in those two claims may strike the center and periphery of the energy zone either sequentially, simultaneously, or otherwise.

B

We must now consider whether the disclaimer attaching to claims 1 and 3 of the '880 patent also applies to claims 16 and 18 of the same patent, as argued by Raytek. We note *1333 that the patentability of claims 16 and 18 stands on their own merit, as the patentee has not tied the fate of those claims to claim 1 and 3, as it has done for the

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'678 and '679 patents. *See* Parts V.A. and VI.A., *infra*. Since the doctrine of prosecution disclaimer is inextricably tied to the arguments, amendments or concessions made by the patentee during prosecution, our analysis must necessarily begin with the prosecution history of claims 16 and 18.

During prosecution of the '880 patent, the examiner rejected claims 1 through 15 as obvious based on Everest, Darringer and JP 62-12848. In response, Omega argued that those claims did not add substantial heat to the energy zone. As part of that response, the patentee also added nine new claims, including claims 16 and 18. There was no argument or substantive comment on the newly added claims; Omega directed all of its effort on overcoming the rejection of claims 1 through 15.

Subsequently, Omega and the examiner had four telephonic interviews over the space of a week in February of 1997, culminating *inter alia* in the patentee's voluntary addition of the word "only" to the "means for causing" in claim 16. As a result of that addition, claim 16 and its dependent claim 18 now "identify and define both the center and *only* the periphery of the said energy zone." The Examiner Interview Summary Record provided a short explanation for that voluntary amendment:

Claims 1, 8, 9, 11, 12, 15, 16, 22, 24 were amended to clearly define the invention over the prior art of the record [i.e., Everest and JP 62-12848]. Applicant will submit a new terminal disclaimer. The changes to the claims will be submitted in a Supplemental Amendment.

Because the examiner deemed it unnecessary for the applicant to provide a separate record of the substance of the interview, Omega's Supplemental Amendment only contained this cryptic statement: "Responsive to numerous telephone conversations with the Examiner, please amend the above identified application as follows." Except for the changes to the claims' text, Omega did not provide any reason for the amendments.

[5] Although the outcome of the changes on the claims' text is unmistakable, its effects and

reasons are at best ambiguous. As we explained above, *see* Part IV.A., *supra*, the addition of the term "only" has multiple reasonable bases and is therefore insufficient to tax the patentee with a disavowal of either the central laser beam or the injection of heat into the energy zone. Nor can such disclaimers be drawn from the mere statements "[r]esponsive to numerous telephone communications with the Examiner" and "to clearly define the invention over the prior art." To conclude otherwise would require an ungrounded leap of logic, requiring us to assume that the clear definition of the invention means an unequivocal disclaimer of the addition of heat into the energy zone or even a surrender of the central laser beam specifically recited by the claim's text. Neither logic nor justice permits such a leap.

Moreover, we decline to vest claims 16 and 18 with the disavowal attached to claims 1 and 3. The prosecution disclaimer arose from the patentee's arguments regarding the term "to outline" present in claims 1 and 3. However, neither claim 16 nor 18 contains the term "to outline" or equivalent terms. And the patentee did not direct any of its disavowing arguments or comments to claims 16 and 18; they were all focused on overcoming the rejection of claims 1 through 15. Without the common term "to outline" or an indication by the patentee that the disavowal should also cover the newly added claims, there is no ground upon which a prosecution disclaimer may rest.

Consequently, there is no clear and unmistakable disclaimer attached to claims 16 and 18 of the '880 patent. As to those two claims, the patentee has neither disavowed a central laser beam nor the injection of heat into the energy zone.

C

We must now ascertain the disclosed structures corresponding to the function identified in claims 16 and 18. The written description of the '880 patent discusses a laser beam striking the center of the energy zone only once, when it describes the functioning of the single laser in figures 11 and 12. '880 patent, col. 8, ll. 19-25. In that discussion, the specification clearly links the function of outlining

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the periphery of the energy zone with a combination of motor, slip rings, counterweights, screw adjustments and pivot point. *Id.*, col. 7, l. 50 - col. 8, l. 14, and col. 8, ll. 26-36. That combination of equipment causes the laser to outline the zone by rotating around the pivot point, and to return to "the center of the target" once *1334 the motor is turned off. *Id.*, col. 8, ll. 21-26. Omega concedes that this combination provides the only corresponding structure expressly discussed in the specification that both identifies the center and also outlines the energy zone.

[6] Despite that concession, Omega also contends that one of skill in the art would understand that lenses, prisms, and laser beam splitting device are disclosed structures corresponding to the claimed means. That argument is unavailing for two reasons. First, those structures are not clearly linked to the function recited in claims 16 and 18. Although the splitting device, lenses, and prisms appear in the '880 patent, *see id.*, col. 6, ll. 19-25 and col. 7, ll. 1-2, the specification does not clearly associate those structures with the claimed function. Indeed, the sole function expressly performed by those structures is to cause the laser beam to outline the periphery of the energy zone; there is no description at all that the laser beam could strike the center of the energy zone. *Id.* Unless the structures are clearly associated with the claimed function, they cannot be corresponding structures for purposes of § 112, ¶ 6. *See B. Braun Med.*, 124 F.3d at 1424-25, 43 USPQ2d at 1900. Second, Omega impermissibly relies on expert declarations to clearly link the claimed function and the laser splitting device, lenses, and prisms. Although expert testimony and declarations are useful to confirm that the construed meaning is consistent with the denotation ascribed by those in the field of the art, *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1309, 51 USPQ2d 1161, 1168 (Fed. Cir. 1999), such extrinsic evidence cannot be used to vary the plain language of the patent document. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1584, 39 USPQ2d 1573, 1577 (Fed. Cir. 1996). Yet, Omega submits its expert declarations not to shed light on this field of art,

but to rewrite the patent's specification and explicitly provide for the laser splitting device, lenses, and prisms to strike the center of the energy zone. That we cannot accept. *See id.*

Accordingly, the laser splitting device, lenses, and prisms are not corresponding structures to the "means for causing" function in claims 16 and 18. Only the combination of motor, slip rings, counterweights, screw adjustments and pivot point is clearly linked to that function.

D

As for claims 1 and 3 above, we must also reverse the grant of summary judgment of noninfringement regarding claims 16 and 18. We have corrected the district court's construction of the claimed function, casting doubt on the determination of no functional identity upon which the district court relied. Because of our correction and the evidence submitted by Omega to overcome the summary judgment motion, *see Part III.D., supra*, triable issues of fact now exist.

V

Having resolved the dispute surrounding the '880 patent, we now turn to the summary judgment that Raytek does not infringe the '678 patent. Because the district court erred in its claim construction, we reverse.

A

Not drafted in means-plus-function format, the fourteen asserted claims of the '678 patent all require the laser beams "to outline" the energy zone or its periphery. [FN3] *See '678 patent*, col. 10-12. In its construction of that term, the district court repeated the error it made in interpreting the function in claims 1 and 3 of the '880 patent: it added a negative limitation which precluded any projection of light into the interior or center of the energy zone.

That was error. In narrowing the '678 patent claims, the district court relied on the same reasons it used to add a negative limitation to the function disclosed by claims 1 and 3 of the '880 patent. Outside of the means-plus-function context and

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given the similarity between these related patents, those reasons are even more clearly flawed. As we explained above, neither the plain text of the claims, the specification, nor the file wrapper justifies the imposition of this negative limitation. *See* Part III.A., *supra*. Consequently, because there is no support in the intrinsic evidence for the district court's departure from the claims' ordinary meaning, we cannot sustain its claim construction.

*1335 B

We agree with Raytek that the disclaimer from the prosecution of claims 1 of the '880 patent attaches to the construction of the '678 patent and narrows the broad scope of the asserted claims. Despite Omega's assertions to the contrary, prosecution disclaimer may arise from disavowals made during the prosecution of ancestor patent applications. *See Advanced Cardiovascular Sys., Inc. v. Medtronic, Inc.*, 265 F.3d 1294, 1305, 60 USPQ2d 1161, 1168-69 (Fed. Cir. 2001) ("The prosecution history of a related patent can be relevant if, for example, it addresses a limitation in common with the patent in suit."); *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 980, 52 USPQ2d 1109, 1114 (Fed. Cir. 1999) ("When multiple patents derive from the same initial application, the prosecution history regarding a claim limitation in any patent that has issued applies with equal force to subsequently issued patents that contain the same claim limitation."). As long as the same claim limitation is at issue, prosecution disclaimer made on the same limitation in an ancestor application will attach. *Augustine Med., Inc. v. Gaymar Indus., Inc.*, 181 F.3d 1291, 1300, 50 USPQ2d 1900, 1907 (Fed. Cir. 1999) ("[T]he prosecution of a parent application may limit the scope of a later application using the same claim term.").

[7] Omega attempts to avoid this doctrine by citing *Advanced Cardiovascular* as shielding continuations-in-part from narrowing disavowals made in parent applications. Our precedent holds to the contrary, indicating that an interpretation asserted in the prosecution of a parent application can also affect continuation applications, *Elkay*, 192 F.3d at 980, 52 USPQ2d at 1114, continuation-in-part applications, *Wang Labs.,*

Inc. v. Am. Online Inc., 197 F.3d 1377, 1384, 53 USPQ2d 1161, 1165 (Fed. Cir. 1999) ("[T]his subject matter is common to the continuation-in-part application, and argument concerning the [prior art] reference was correctly viewed as applying to the common subject matter."), and even related continuation-in-part applications arising from the same parent, *Jonsson v. Stanley Works*, 903 F.2d 812, 818, 14 USPQ2d 1863, 1869 (Fed. Cir. 1990) (holding that when two patents issued from continuation-in-part applications derived from one original application, the prosecution history of a claim limitation in the first patent to issue was properly applied to the same claim limitation in the second patent to issue). Consequently, that the '678 patent is a continuation-in-part of the '880 patent does not shield it from narrowing disclaimers made during the prosecution of a parent application.

Moreover, Omega misunderstands *Advanced Cardiovascular*, which distinguished *Wang Labs* and *Jonsson*, because, in *Advanced Cardiovascular*, "there are no common claim terms in dispute." *Advanced Cardiovascular*, 265 F.3d at 1305-06, 60 USPQ2d at 1169. As we emphasized in that case:

Indeed, the present case involves the absence of a claim term. The patentee's whole point in filing the application that resulted in the '233 patent was to secure broader claims. As Medtronic admits in its opening brief, "none of the '233 Patent claims explicitly state the guidewire tube runs inside a balloon catheter [which is the disputed claim]." *Id.* at 1306, 60 USPQ2d at 1169. Contrary to *Advanced Cardiovascular*, there is a common term in dispute here. The disputed term "to outline" is the same throughout all five patents in the genealogy, including the '880 and '678 patents. The patentee made a clear and unmistakable disclaimer of claim scope in its prosecution of the parent '880 patent, and we presume, unless otherwise compelled, that the same claim term in the same patent or related patents carries the same construed meaning. *See Fin Control Sys. Pty, Ltd. v. OAM, Inc.*, 265 F.3d 1311, 1318, 60 USPQ2d 1203, 1208 (Fed. Cir. 2001). *Advanced Cardiovascular* is thus inapposite; rather,

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Jonsson and Wang Labs control the disposition of this case.

Without any basis for the district court's negative limitation, we must give the term "to outline" its presumptive denotation of "to draw a line that marks the outer limits of an object or figure." *See Webster's, supra*, at 1602. However, because prosecution disclaimer made in the '880 patent extends to the '678 patent, we rule that any energy directed inside the energy zone cannot add appreciable heat to the energy zone as to affect the accuracy of the temperature measurement.

C

Because we have corrected the district court's construction of the disputed claim limitation and in light of the expert declarations submitted by Omega to overcome the *1336 summary judgment motions, triable issues of facts regarding Raytek's central laser beam remain. We therefore reverse the grant of summary judgment regarding the '678 patent and remand for further proceedings.

VI

We now address the summary judgment that Raytek does not infringe the '679 patent and that claims 33 and 41 of that patent were invalid for indefiniteness. This patent is a continuation in part of the '678 patent, and all 51 asserted claims [FN4] cover either a method or an apparatus which uses at least three laser beams "to outline" the energy zone. [FN5] Of the 51 asserted claims, six of those claims--claims 20, 26-28, 32, and 53--are drafted in means-plus-function format.

A

As with all infringement and invalidity analyses, we commence our inquiry with the construction of the claims in suit. *TurboCare*, 264 F.3d at 1120, 60 USPQ2d at 1024; *SIBIA Neurosciences, Inc. v. Cadus Pharm. Corp.*, 225 F.3d 1349, 1355, 55 USPQ2d 1927, 1930 (Fed. Cir. 2000) ("The first step in any invalidity analysis is claim construction, an issue of law that this court reviews de novo."). In construing the non-means-plus-function claims, the district court adopted the same negative limitation as for the '678 patent, precluding any projection of

light into the interior or center of the energy zone. The trial court expressly based that ruling on the same reasons it gave in connection with the '678 patent. Since we deemed those grounds inadequate to impose the negative limitation in the '678 patent, it is equally true that those reasons will not form the requisite bases for construing the '679 patent. Unless otherwise compelled, the claims receive their ordinary and accustomed meaning. [FN6]

As with the '678 patent, the disclaimer made by the patentee during the prosecution of the '880 patent flows down to the '679 patent. Indeed, the '679 patent is a continuation in part of the '678 patent, and it is settled that prosecution disclaimer attaches to progeny continuation in part applications where the same claim limitation is at issue. *See Advanced Cardiovascular*, 265 F.3d at 1305, 60 USPQ2d at 1168-69; *Wang Labs.*, 197 F.3d at 1380, 53 USPQ2d at 1165; *Jonsson*, 903 F.2d at 818, 14 USPQ2d at 1869. Consequently, because the prosecution disclaimer made in the '880 patent extends to the '679 patent, we conclude that any energy directed inside the energy zone cannot add appreciable heat to the energy zone as to affect the accuracy of the temperature measurement.

As to the claims of the '679 patent written in means-plus-function format, the district court imposed a negative limitation on the function contained in those claims as it did for claims 1 and 3 of the '880 patent. As the reason for that determination, the district court referred to the analysis provided for claim 1 of the '679 patent. Having deemed that reasoning erroneous, we similarly correct the interpretation of the function in those means-plus-function claims and clarify that the claim language does not preclude light from striking the interior of the energy zone, although prosecution disclaimer precludes the addition of appreciable heat to the energy zone as to affect the accuracy of the temperature measurement.

B

The district court granted summary judgment of noninfringement as to the '679 patent based on its erroneous claim construction. Since we have now corrected the claim construction and in light of the

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expert declarations submitted by Omega to overcome the summary judgment motions, triable issues of fact regarding Raytek's central laser beam remain. The summary adjudication must therefore be reversed and the case remanded for factual findings.

***1337** The district court also ruled that claims 33 and 41 of the '679 patent were indefinite, because it deemed those claims internally inconsistent. The trial court noted that those two claims expressly require a laser beam directed to the center of the energy zone, while at the same time being respectively dependent on independent claims 32 and 38 which were construed as excluding that central laser beam. Reasoning that claims 33 and 41 could not simultaneously require and preclude that central laser beam, the court concluded that one of skill in the art could not determine the scope of those claims, rendering them indefinite. Our correction of the claim construction has now removed the improper negative limitation and thus negated the inherent contradiction identified by the district court. Accordingly, we reverse the summary adjudication that claims 33 and 41 of the '679 patent are invalid for indefiniteness.

CONCLUSION

We reverse the grants of summary judgment that Raytek does not infringe the patents in suit and that claims 33 and 41 of the '679 patent are indefinite. Having done so, we remand these cases for further proceedings consistent with this opinion.

REVERSED AND REMANDED

FN1. We note that this is the same standard applicable, in the context of the doctrine of equivalents, to the doctrine of argument-based estoppel, *Litton Sys., Inc. v. Honeywell, Inc.*, 140 F.3d 1449, 1458,46 USPQ2d 1321, 1327 (Fed. Cir. 1998), and that our precedent has recognized a relation between the doctrines of argument-based estoppel and prosecution disclaimer, *Alpex Computer Corp. v. Nintendo Co. Ltd.*, 102 F.3d 1214, 1221,40 USPQ2d 1667, 1673 (noting that

"just as prosecution history estoppel may act to estop an equivalence argument under the doctrine of equivalents, positions taken before the PTO may bar an inconsistent position on claim construction").

FN2. Because Omega did not pursue any argument that Raytek infringed the '880 patent under the doctrine of equivalents, we limit our discussion to literal infringement.

FN3. Except for independent claim 7, all the asserted claims of the '678 patent include the limitation "to outline." Claim 7 requires that the laser beams "identify the extent of said radiation zone." '678 patent, col. 11, ll. 41-42. Because the district court and the parties treated the limitation in claim 7 as an equivalent of "to outline," tying their fates together, we shall do the same.

FN4. Although the '679 patent contains 53 claims which were all asserted in the complaint, the parties subsequently submitted a stipulation withdrawing claims 15 and 16 from the litigation. We will consequently not address those withdrawn claims.

FN5. Although some of the claims of the '679 patent use phrases akin to the term "to outline," the district court and the parties treated those analogous phrases as equivalents to the term "to outline," tying their fates together. We will therefore do the same.

FN6. We note that the district court's claim construction inevitably required the invalidation of claims 33 and 41, in contradiction to the canon that courts should attempt to construe claims to preserve their validity. *See Wang Labs., Inc. v. Am. Online, Inc.*, 197 F.3d 1377, 1383,53 USPQ2d 1161, 1165 (Fed. Cir. 1999). Since the intrinsic evidence did not

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compel the invalidating construction, the
district court thus erred.

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END OF DOCUMENT

Related Proceedings Appendix

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In re Lee

U.S. Court of Appeals Federal Circuit

No. 00-1158

Decided January 18, 2002

PATENTS**[1] Practice and procedure in Patent and Trademark Office -- Board of Patent Appeals and Interferences -- In general (§ 110.1101)****Patentability/Validity -- Obviousness -- Combining references (§ 115.0905)****Patentability/Validity -- Obviousness -- Evidence of (§ 115.0906)**

Rejection of patent application for obviousness under 35 U.S.C. § 103 must be based on evidence comprehended by language of that section, and search for and analysis of prior art includes evidence relevant to finding of whether there is teaching, motivation, or suggestion to select and combine references relied on as evidence of obviousness; factual inquiry whether to combine references must be thorough and searching, based on objective evidence of record, and Board of Patent Appeals and Interferences must explain reasons why one of ordinary skill in art would have been motivated to select references and to combine them to render claimed invention obvious.

[2] Patentability/Validity -- Obviousness -- Combining references (§ 115.0905)**JUDICIAL PRACTICE AND PROCEDURE****Procedure -- Judicial review -- Standard of review --Patents (§ 410.4607.09)**

Board of Patent Appeals and Interferences improperly relied upon "common knowledge and common sense" of person of ordinary skill in art to find invention of patent application obvious over combination of two prior art references, since factual question of motivation to select and combine

references is material to patentability, and could not be resolved on subjective belief and unknown authority, since deferential review of agency decisions under Administrative Procedure Act reinforces obligation of board to develop evidentiary basis for its findings, since board's rejection of need for any specific hint or suggestion in particular reference to support combination constituted omission of relevant factor required by precedent, and thus was both legal error and arbitrary agency action, since board's findings must extend to all material facts and be documented on record, and since "common knowledge and common sense" are not specialized knowledge and expertise of agency contemplated by APA, and may not be substituted for evidence, although they may be applied to analysis of evidence.

PATENTS**[3] Practice and procedure in Patent and Trademark Office -- Board of Patent Appeals and Interferences -- In general (§ 110.1101)****Patentability/Validity -- Obviousness -- Evidence of (§ 115.0906)****JUDICIAL PRACTICE AND PROCEDURE****Procedure -- Judicial review -- Standard of review --Patents (§ 410.4607.09)**

Patent examiners and Board of Patent Appeals and Interferences, in relying on what they assert to be general knowledge to negate patentability on ground of obviousness, must articulate that knowledge and place it on record, since examiners and board are presumed to act from viewpoint of person of ordinary skill in art in finding relevant facts, assessing significance of prior art, and making ultimate determination of obviousness issue; failure to do so is not consistent with either effective administrative procedure or effective judicial review, and board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but

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must set forth rationale on which it relies.

[4] Procedure -- Court of Appeals for the Federal Circuit (§ 410.03)

Procedure -- Judicial review -- Standard of review --Patents (§ 410.4607.09)

U.S. Court of Appeals for the Federal Circuit will not consider proposed alternative grounds for affirming decision of Board of Patent Appeals and Interferences rejecting patent application for obviousness, since alternative grounds were made at oral argument and constitute post hoc rationalization for agency action, consideration of which would deprive aggrieved party of fair opportunity to support its position.

***1431** Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent application of Sang-Su Lee, serial no. 07/631,210, directed to method of automatically displaying functions of video display device and demonstrating how to select and adjust functions to facilitate user response. Applicant appeals from decision upholding rejection of all claims for obviousness, and from reaffirmation of that decision on reconsideration. Reversed and remanded.

Richard H. Stern and Robert E. Bushnell, Washington, D.C., for Sang Su Lee.

Sidney O. Johnson Jr., associate solicitor, John M. Whealan, solicitor, and Raymond T. Chen, Maximilian R. Peterson, and Mark Nagumo, associate solicitors, Arlington, Va., for Director of U.S. Patent and Trademark Office.

Before Newman, Clevenger, and Dyk, circuit judges.

Newman, J.

Sang-Su Lee appeals the decision of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office, rejecting all of the claims of Lee's patent application Serial No. 07/631,210 entitled "Self-Diagnosis and Sequential-Display Method of Every Function." [FN1] We vacate the Board's decision for failure to

meet the adjudicative standards for review under the Administrative Procedure Act, and remand for further proceedings.

The Prosecution Record

Mr. Lee's patent application is directed to a method of automatically displaying the functions of a video display device and demonstrating how to select and adjust the functions in order to facilitate response by the user. The display and demonstration are achieved using computer-managed electronics, including pulse-width modulation and auto-fine-tuning pulses, in accordance with procedures described in the specification. Claim 10 is representative:

10. A method for automatically displaying functions of a video display device, comprising:

determining if a demonstration mode is selected;

if said demonstration mode is selected, automatically entering a picture adjustment mode having a picture menu screen displaying a list of a plurality of picture functions; and

automatically demonstrating selection and adjustment of individual ones of said plurality of picture functions.

The examiner rejected the claims on the ground of obviousness, citing the combination of two references: United States Patent No. 4,626,892 to Nortrup, and the Thunderchopper Helicopter Operations Handbook for a video game. The Nortrup reference describes a television set having a menu display by which the user can adjust various picture and audio functions; however, the Nortrup display does not include a demonstration of how to adjust the functions. The Thunderchopper Handbook describes the Thunderchopper game's video display as having a "demonstration mode" showing how to play the game; however, the Thunderchopper Handbook makes no mention of the adjustment of picture or audio functions. The examiner held that it ***1432** would have been obvious to a person of ordinary skill to combine the teachings of these references to produce the Lee

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system.

Lee appealed to the Board, arguing that the Thunderchopper Handbook simply explained how to play the Thunderchopper game, and that the prior art provided no teaching or motivation or suggestion to combine this reference with Nortrup, or that such combination would produce the Lee invention. The Board held that it was not necessary to present a source of a teaching, suggestion, or motivation to combine these references or their teachings. The Board stated:

The conclusion of obviousness may be made from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference.

Board op. at 7. The Board did not explain the "common knowledge and common sense" on which it relied for its conclusion that "the combined teachings of Nortrup and Thunderchopper would have suggested the claimed invention to those of ordinary skill in the art."

Lee filed a request for reconsideration, to which the Board responded after five years. The Board reaffirmed its decision, stating that the Thunderchopper Handbook was "analogous art" because it was "from the same field of endeavor" as the Lee invention, and that the field of video games was "reasonably pertinent" to the problem of adjusting display functions because the Thunderchopper Handbook showed video demonstrations of the "features" of the game. On the matter of motivation to combine the Nortrup and Thunderchopper references, the Board stated that "we maintain the position that we stated in our prior decision" and that the Examiner's Answer provided "a well reasoned discussion of why there is sufficient motivation to combine the references." The Board did not state the examiner's reasoning, and review of the Examiner's Answer reveals that the examiner merely stated that both the Nortrup function menu and the Thunderchopper demonstration mode are program features and that the Thunderchopper mode "is user-friendly" and it functions as a tutorial, and that it would have been

obvious to combine them.

Lee had pressed the examiner during prosecution for some teaching, suggestion, or motivation in the prior art to select and combine the references that were relied on to show obviousness. The Examiner's Answer before the Board, plus a Supplemental Answer, stated that the combination of Thunderchopper with Nortrup "would have been obvious to one of ordinary skill in the art since the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software," and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial." The Board adopted the examiner's answer, stating "the examiner has provided a well reasoned discussion of these references and how the combination of these references meets the claim limitations." However, perhaps recognizing that the examiner had provided insufficient justification to support combining the Nortrup and Thunderchopper references, the Board held, as stated *supra*, that a "specific hint or suggestion" of motivation to combine was not required.

This appeal followed.

Judicial Review

Tribunals of the PTO are governed by the Administrative Procedure Act, and their rulings receive the same judicial deference as do tribunals of other administrative agencies. *Dickinson v. Zurko*, 527 U.S. 150, 50 USPQ2d 1930 (1999). Thus on appeal we review a PTO Board's findings and conclusions in accordance with the following criteria:

5 U.S.C. § 706(2) The reviewing court shall--

(2) hold unlawful and set aside agency actions, findings, and conclusions found to be--

(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

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(E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute;

For judicial review to be meaningfully achieved within these strictures, the agency tribunal must present a full and reasoned explanation of its decision. The agency tribunal *1433 must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts. The Court has often explained:

The Administrative Procedure Act, which governs the proceedings of administrative agencies and related judicial review, establishes a scheme of "reasoned decisionmaking." Not only must an agency's decreed result be within the scope of its lawful authority, but the process by which it reaches that result must be logical and rational. *Allentown Mack Sales and Service, Inc. v. National Labor Relations Bd.*, 522 U.S. 359, 374 (1998) (citation omitted). This standard requires that the agency not only have reached a sound decision, but have articulated the reasons for that decision. The reviewing court is thus enabled to perform meaningful review within the strictures of the APA, for the court will have a basis on which to determine "whether the decision was based on the relevant factors and whether there has been a clear error of judgment." *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402, 416 (1971). Judicial review of a Board decision denying an application for patent is thus founded on the obligation of the agency to make the necessary findings and to provide an administrative record showing the evidence on which the findings are based, accompanied by the agency's reasoning in reaching its conclusions. See *In re Zurko*, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001) (review is on the administrative record); *In re Gartside*, 203 F.3d 1305, 1314, 53 USPQ2d 1769, 1774 (Fed. Cir. 2000) (Board decision "must be justified within the four corners of the record").

[1] As applied to the determination of patentability *vel non* when the issue is

obviousness, "it is fundamental that rejections under 35 U.S.C. § 103 must be based on evidence comprehended by the language of that section." *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983). The essential factual evidence on the issue of obviousness is set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966) and extensive ensuing precedent. The patent examination process centers on prior art and the analysis thereof. When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. See, e.g., *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the *Graham* factors).

"The factual inquiry whether to combine references must be thorough and searching." *Id.* It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. See, e.g., *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed. Cir. 2000) ("a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding'" (quoting *C.R. Bard, Inc. v. M3 Systems, Inc.*, 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998))); *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."); *In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988) ("teachings of references can be

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combined *only* if there is some suggestion or incentive to do so.") (emphasis in original) (quoting *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)).

The need for specificity pervades this authority. See, e.g., *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed"); *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) ("even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. *1434 In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); *In re Fritch*, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (the examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references").

[2] With respect to Lee's application, neither the examiner nor the Board adequately supported the selection and combination of the Nortrup and Thunderchopper references to render obvious that which Lee described. The examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to

this combination of references, simply to "[use] that which the inventor taught against its teacher." *W.L. Gore v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion.

Deferential judicial review under the Administrative Procedure Act does not relieve the agency of its obligation to develop an evidentiary basis for its findings. To the contrary, the Administrative Procedure Act reinforces this obligation. See, e.g., *Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co.*, 463 U.S. 29, 43 (1983) ("the agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'") (quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962)); *Securities & Exchange Comm'n v. Chenery Corp.*, 318 U.S. 80, 94 (1943) ("The orderly function of the process of review requires that the grounds upon which the administrative agency acted are clearly disclosed and adequately sustained.").

In its decision on Lee's patent application, the Board rejected the need for "any specific hint or suggestion in a particular reference" to support the combination of the Nortrup and Thunderchopper references. Omission of a relevant factor required by precedent is both legal error and arbitrary agency action. See *Motor Vehicle Manufacturers*, 463 U.S. at 43 ("an agency rule would be arbitrary and capricious if the agency . . . entirely failed to consider an important aspect of the problem"); *Mullins v. Department of Energy*, 50 F.3d 990, 992 (Fed. Cir. 1995) ("It is well established that agencies have a duty to provide reviewing courts with a sufficient explanation for their decisions so that those decisions may be judged against the relevant statutory standards, and that failure to provide such an explanation is grounds for striking down the action."). As discussed in *National Labor Relations Bd. v. Ashkenazy Property Mgt. Corp.*,

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817 F.2d 74, 75 (9th Cir. 1987), an agency is "not free to refuse to follow circuit precedent."

The foundation of the principle of judicial deference to the rulings of agency tribunals is that the tribunal has specialized knowledge and expertise, such that when reasoned findings are made, a reviewing court may confidently defer to the agency's application of its knowledge in its area of expertise. Reasoned findings are critical to the performance of agency functions and judicial reliance on agency competence. See *Baltimore and Ohio R. R. Co. v. Aberdeen & Rockfish R. R. Co.*, 393 U.S. 87, 91-92 (1968) (absent reasoned findings based on substantial evidence effective review would become lost "in the haze of so-called expertise"). The "common knowledge and common sense" on which the Board relied in rejecting Lee's application are not the specialized knowledge and expertise contemplated by the Administrative Procedure Act. Conclusory statements such as those here provided do not fulfill the agency's obligation. This court explained in *Zurko*, 258 F.3d at 1385, 59 USPQ2d at 1697, that "deficiencies of the cited references cannot be remedied by *1435 the Board's general conclusions about what is 'basic knowledge' or 'common sense.'" The Board's findings must extend to all material facts and must be documented on the record, lest the "haze of so-called expertise" acquire insulation from accountability. "Common knowledge and common sense," even if assumed to derive from the agency's expertise, do not substitute for authority when the law requires authority. See *Allentown Mack*, 522 U.S. at 376 ("Because reasoned decisionmaking demands it, and because the systemic consequences of any other approach are unacceptable, the Board must be required to apply in fact the clearly understood legal standards that it enunciates in principle . . .")

The case on which the Board relies for its departure from precedent, *In re Bozek*, 416 F.2d 1385, 163 USPQ 545 (CCPA 1969), indeed mentions "common knowledge and common sense," the CCPA stating that the phrase was used by the Solicitor to support the Board's conclusion of obviousness based on evidence in the prior art. *Bozek* did not hold that common knowledge and

common sense are a substitute for evidence, but only that they may be applied to analysis of the evidence. *Bozek* did not hold that objective analysis, proper authority, and reasoned findings can be omitted from Board decisions. Nor does *Bozek*, after thirty-two years of isolation, outweigh the dozens of rulings of the Federal Circuit and the Court of Customs and Patent Appeals that determination of patentability must be based on evidence. This court has remarked, in *Smiths Industries Medical Systems, Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1421 (Fed. Cir. 1999), that *Bozek's* reference to common knowledge "does not in and of itself make it so" absent evidence of such knowledge.

[3] The determination of patentability on the ground of unobviousness is ultimately one of judgment. In furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. The patent examiner and the Board are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of "the person having ordinary skill in the art to which said subject matter pertains," the words of section 103. In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board are presumed to act from this viewpoint. Thus when they rely on what they assert to be general knowledge to negate patentability, that knowledge must be articulated and placed on the record. The failure to do so is not consistent with either effective administrative procedure or effective judicial review. The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies.

Alternative Grounds

[4] At oral argument the PTO Solicitor proposed alternative grounds on which this court might

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affirm the Board's decision. However, as stated in *Burlington Truck Lines, Inc. v. United States*, 371 U.S. 156, 168 (1962), "courts may not accept appellate counsel's *post hoc* rationalization for agency action." Consideration by the appellate tribunal of new agency justifications deprives the aggrieved party of a fair opportunity to support its position; thus review of an administrative decision must be made on the grounds relied on by the agency. "If those grounds are inadequate or improper, the court is powerless to affirm the administrative action by substituting what it considers to be a more adequate or proper basis." *Securities & Exchange Comm'n v. Chenery Corp.*, 332 U.S. 194, 196 (1947). As reiterated in *Federal Election Comm'n v. Akins*, 524 U.S. 11, 25 (1998), "If a reviewing court agrees that the agency misinterpreted the law, it will set aside the agency's action and remand the case -- even though the agency (like a new jury after a mistrial) might later, in the exercise of its lawful discretion, reach the same result for a different reason." Thus we decline to consider alternative grounds that might support the Board's decision.

Further Proceedings

Sound administrative procedure requires that the agency apply the law in accordance with statute and precedent. The agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action. In *Radio-Television News Directors Ass'n v. FCC*, 184 F.3d 872 (D.C. Cir. 1999) *1436 the court discussed the "fine line between agency reasoning that is 'so crippled as to be unlawful' and action that is potentially lawful but insufficiently or inappropriately explained," quoting from *Checkosky v. Securities & Exch. Comm'n*, 23 F.3d 452, 464 (D.C. Cir. 1994); the court explained that "[i]n the former circumstance, the court's practice is to vacate the agency's order, while in the latter the court frequently remands for further explanation (including discussion of the relevant factors and precedents) while withholding judgment on the lawfulness of the agency's proposed action." *Id.* at 888. In this case the Board's analysis of the Lee invention does not comport with either the legal

requirements for determination of obviousness or with the requirements of the Administrative Procedure Act that the agency tribunal set forth the findings and explanations needed for "reasoned decisionmaking." Remand for these purposes is required. *See Overton Park*, 401 U.S. at 420-221 (remanding for further proceedings appropriate to the administrative process).

VACATED AND REMANDED

FN1. *Ex parte Lee*, No. 1994-1989 (Bd. Pat. App. & Int. Aug. 30, 1994; on reconsid'n Sept. 29, 1999).

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Related Proceedings Appendix

In re Zurko, 258 F.3d 1379, 59 U.S.P.Q.2d 1693 (Fed. Cir. 2001)

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In re Zurko

U.S. Court of Appeals Federal Circuit

No. 96-1258

Decided August 2, 2001

PATENTS

[1] Patentability/Validity -- Obviousness -- Combining references (§ 115.0905)

JUDICIAL PRACTICE AND PROCEDURE

Procedure -- Judicial review -- Standard of review -- Patents (§ 410.4607.09)

Decision of Board of Patent Appeals and Interferences sustaining obviousness rejection of patent application for method of improving security in computer system is reversed, even though board's factual findings underlying its determination are reviewed under "substantial evidence" standard, since prior art references relied upon by board do not teach limitation requiring communications between user and "trusted" environment along "trusted" path, and since deficiencies of references cannot be remedied by reliance upon additional combination of alternative references cited for first time on appeal, or by board's general conclusion, unsupported by evidence in record, that requiring communication with trusted environment over trusted path would be "basic knowledge" or "common sense" to person of ordinary skill in art; although board's expertise alone may provide sufficient support for conclusions as to peripheral issues, its core factual findings in patentability determinations must be supported by concrete evidence in record.

On remand from the U.S. Supreme Court.

Patent application of Mary E. Zurko, Thomas A. Casey Jr., Morie Gasser, Judith S. Hall, Clifford E.

Kahn, Andrew H. Mason, Paul D. Sawyer, Leslie R. Kendall, and Steven B. Lipner, serial no. 07/479,666 (method for improving security in a computer system). Board of Patent Appeals and Interferences sustained examiner's rejection of application under 35 U.S.C. § 103. The U.S. Court of Appeals *1694 for the Federal Circuit reversed on appeal (42 USPQ2d 1476). On rehearing en banc, the Federal Circuit held (46 USPQ2d 1691) that proper standard of review for fact findings underlying patentability determinations by Patent and Trademark Office is "clearly erroneous" standard, rather than more deferential standard found in Administrative Procedure Act. The U.S. Supreme Court reversed the Federal Circuit's en banc decision and remanded, holding (50 USPQ2d 1930) that PTO's findings of fact must be reviewed under either "substantial evidence" or "arbitrary and capricious" APA standards of review. On remand, the Federal Circuit again reverses board's decision.

Linda Moncys Isacson, associate solicitor, John M. Whealan, solicitor, and Kenneth R. Corsello and Thomas J. Finn, associate solicitors, U.S. Patent and Trademark Office, Arlington, Va., for Commissioner of Patents and Trademarks.

John F. Sweeney, Michael O. Cummings, Jon T. Hohenthanner, Israel Blum, Steven F. Meyer, and Brenda Pomerance, of Morgan & Finnegan, New York, N.Y.; Irene Kosturakis and Russell T. Wong, of Compaq Computer Corp., Houston, Texas; Ernest Gellhorn, Washington, D.C.; Janice M. Mueller, of Suffolk University Law School, Boston Mass.; Ronald C. Hudgens, of Digital Equipment Corp., Maynard, Mass., for Mary E. Zurko et al.

Before Newman, circuit judge, Archer, senior circuit judge, and Michel, circuit judge.

Archer, S.J.

This case is before us on remand from the

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Supreme Court of the United States. *Dickinson v. Zurko*, 527 U.S. 150, 50 USPQ2d 1930 (1999) ("Zurko III"). In *Zurko III*, the Court reversed our judgment and remanded the case because we had reviewed the factual findings of the Board of Patent Appeals and Interferences ("Board") for clear error, an incorrect standard of review.

The Board decision at issue, *Ex parte Zurko*, No. 94-3967 (Bd. Pat. Apps. & Int. Aug. 4, 1995), sustained the rejection of U.S. Patent Application No. 07/479,666 ("the '666 application") under 35 U.S.C. § 103 (1994). In our initial review of this decision, we determined that the Board's findings were clearly erroneous and we reversed. *In re Zurko*, 111 F.3d 887, 42 USPQ2d 1476 (Fed. Cir. 1997) ("Zurko I"). At the Commissioner's suggestion, we then reheard this case en banc to reconsider the question of the appropriate standard of review. The Commissioner argued that Board findings should be reviewed under the standards of the Administrative Procedure Act (APA), namely the substantial evidence or arbitrary and capricious standard. 5 U.S.C. § 706 (1994). The en banc court held, however, that clear error was the correct standard of review for Board findings of fact and adopted the conclusions of the original panel decision. *In re Zurko*, 142 F.3d 1447, 46 USPQ2d 1691 (Fed. Cir. 1998) ("Zurko II").

The Commissioner then petitioned for review by the Supreme Court, and the Court reversed, holding that Board findings of fact must be reviewed under the APA standards of review. The Court did not specify which APA standard of review to apply, substantial evidence or arbitrary and capricious. We subsequently decided this question in *In re Gartside*, 203 F.3d 1305, 53 USPQ2d 1769 (Fed. Cir. 2000), and held that substantial evidence is the correct APA standard of review for Board factual findings.

We now revisit the merits of our decision in *Zurko I*, applying the proper APA standard of review. In doing so, we conclude that the outcome of this case does not change with the application of this new standard of review. Because the factual findings underlying the Board's decision are not supported by substantial evidence, we reverse.

BACKGROUND

The '666 application concerns a method for more efficiently creating a secure computer environment. Secure, or "trusted," computer environments employ trusted software designed to preclude unauthorized users and to prevent unintended or unauthorized commands. Such trusted software is often quite costly, compared to untrusted software, so it is desirable to minimize the amount of trusted software in the system. Applicants claim a method for processing trusted commands with a minimum of trusted software.

Representative claim one reads as follows:

1. A machine-executed method for executing a trusted command issued by a user on a computer system, the computer system including an untrusted computing environment and a trusted computing environment, said method comprising the steps of:

*1695 (a) parsing the trusted command in the untrusted computing environment to generate a parsed command;

(b) submitting the parsed command to the trusted computing environment;

(c) displaying a representation of the trusted command to the user through a trusted path;

(d) receiving a signal from the user through a trusted path signifying whether the displayed representation accurately represents the user's intentions;

(e) if the signal signifies that the displayed representation does not accurately represent the user's intentions, then preventing the execution of the parsed command;

(f) if the signal signifies that the displayed representation accurately represents the users intentions, executing the parsed command in the trusted environment.

As set forth in claim one, applicants' method involves processing and verifying a trusted

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command using both trusted and untrusted software. A trusted command is first processed by untrusted software to create a parsed command. The parsed command is then submitted to the trusted computer environment. Execution of this command requires verification along a trusted path. The parsed command is relayed to the user along a trusted path, and, if correct, the user can send a confirming signal back along this trusted path, allowing execution of the command. By processing a trusted command in this manner, the applicants contend they reduce the amount of trusted software. The applicants assert that the parsing step generally requires a large amount of software and that performing this step with untrusted software greatly reduces the amount of trusted code required to process a trusted command.

The Board sustained the Examiner's rejection of claims 1, 4, and 5 of the '666 application under 35 U.S.C. § 103 based on two prior art references. The primary reference is the UNIX operating system, as described in the applicants' information disclosure statement ("IDS"). According to this description, the UNIX system employs both untrusted and trusted code. Furthermore, certain commands in a UNIX system may be parsed in an untrusted environment, and then these parsed commands may be executed by "calling a trusted service that executes in a trusted computing environment."

The secondary reference, also described in applicants' IDS, is Dunford, FILER Version 2.20 ("FILER2"). This program repeats back potentially dangerous commands, requesting confirmation from the user before execution.

Considering the teachings of these two references, the Board concluded that the invention claimed by the '666 application would have been obvious. The Board commented that "the artisan would have been led from these teachings to take the trusted command parsed in an untrusted environment and submitted to the trusted computing environment, as taught by UNIX, and to display the parsed command to the user for confirmation prior to execution, as suggested by [FILER2]." *Ex parte Zurko*, slip op. at 6-7. According to the Board, this

combination would render the claimed invention obvious.

The Board also responded to applicants' arguments that neither reference discloses a trusted path communication to the user and that no teaching of the prior art references motivates the combination of these references to create the claimed invention. The Board said that communication along a trusted path, if not explicit in the prior art, is either inherent or implicit. *Id.* at 7. The Board further adopted the Examiner's assertion that "it is basic knowledge that communication in trusted environments is performed over trusted paths." *Id.* at 8. As for the motivation to combine these references, the Board concluded that it "would have been nothing more than good common sense" to combine the teachings of these references. *Id.* The Board noted that FILER2 taught the verification of dangerous commands in general, suggesting verification of the parsed command submitted to the trusted computing environment in UNIX. Because this verification occurs within a trusted environment, it is "basic knowledge," according to the Board, that this verification would occur along a trusted path. *Id.* at 7-8.

Reviewing the Board's decision in *Zurko I*, we held that "the Board's finding that the prior art teaches, either explicitly or inherently, the step of obtaining confirmation over a trusted pathway [was] clearly erroneous." *Zurko I*, 111 F.3d at 889, 42 USPQ2d at 1478. Indeed, we noted that neither reference relied upon by the Board taught communication with *1696 the user over a trusted pathway. *Id.*, 42 USPQ2d at 1479. We further held that the Board clearly erred in finding that the prior art teaches communicating with the user over both a trusted and an untrusted path. This finding was in conflict with the Board's other finding that trusted communications must be over trusted paths. *Id.* at 890, 42 USPQ2d at 1479.

On remand, applicants urge that we maintain our reversal of the Board's decision, arguing that the decision is legally flawed, or, alternatively, that the Board's factual findings fail under the APA standard of review. The Commissioner responds that we must

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affirm the Board decision because its findings are supported by substantial evidence in the record.

DISCUSSION

A claimed invention is unpatentable for obviousness if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (1994); *Graham v. John Deere Co.*, 383 U.S. 1, 14, 148 USPQ 459, 465 (1966). Obviousness is a legal question based on underlying factual determinations including: (1) the scope and content of the prior art, including what that prior art teaches explicitly and inherently; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *Graham*, 383 U.S. at 17-18, 148 USPQ at 467; *In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ 1614, 1616 (Fed. Cir. 1999); *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (stating that the inherent teachings of a prior art reference is a question of fact). We review the ultimate legal determination of obviousness without deference. *In re Dembiczak*, 175 F.3d at 998, 50 USPQ at 1616. We review factual findings underlying this determination for substantial evidence. *In re Gartside*, 203 F.3d at 1311-16, 53 USPQ2d at 1772-75.

Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938); see also *Zurko III*, 527 U.S. at 162, 50 USPQ2d at 1772-75. A review under this standard "involves an examination of the record as a whole, taking into consideration evidence that both justifies and detracts from the agency's decision." *In re Gartside*, 203 F.3d at 1312, 53 USPQ2d at 1773 (citing *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 487-88 (1951)). In addition, "the possibility of drawing two inconsistent conclusions from the evidence does not prevent an administrative agency's finding from being supported by substantial evidence." *Consolo v. Fed. Maritime Comm'n*, 383 U.S. 607, 619-20 (1966).

The substantial evidence standard has been analogized to the review of jury findings, and it is generally considered to be more deferential than the clearly erroneous standard of review. *Zurko III*, 527 U.S. at 162-63, 50 USPQ2d at 1936. The Supreme Court noted in *Zurko III*, however, that this generally recognized difference is "a subtle one," so fine that in its review of case law in the *Zurko III* decision, the Court could not find any other case where a reviewing court had conceded that the standard of review made a difference. *Id.* Moreover, while appellate courts must respect agency expertise, the Court has "stressed the importance of not simply rubber-stamping agency fact finding." *Id.* (citing *Universal Camera*, 340 U.S. at 477-78). Indeed, the Court observed that Federal Circuit judges "will examine [Board fact] findings through the lens of patent-related experience -- and properly so, for the Federal Circuit is a specialized Court." *Id.* The Court further noted that this "comparative expertise, by enabling the Circuit better to understand the basis for the [Board's] finding of fact, may play a more important role in assuring proper review than would a theoretically somewhat stricter standard." *Id.*

With this guidance from the Supreme Court in mind, we now reconsider the Board's decision. Applicants urge that we reaffirm our conclusion in *Zurko I*, alleging numerous legal and factual errors in the Board decision. These arguments center around two issues. First, applicants argue that the prior art relied upon by the Board does not disclose one of the limitations of their claimed invention, namely communication between a trusted environment and the user along a trusted path. Second, applicants claim that there is no substantial evidence support for the Board's finding of motivation to combine the cited references to yield the claimed invention. We only need to consider the first issue raised by applicants.

As to this first issue, the Commissioner apparently concedes that neither the UNIX IDS disclosure nor FILER2 teaches communications between the user and the trusted environment along a trusted path. Nevertheless, the Commissioner maintains that the Board's findings

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concerning the content of the prior art are supported by four other references in the record. [FN1][1] As to this first issue, the Commissioner apparently concedes that neither the UNIX IDS disclosure nor FILER2 teaches communications between the user and the trusted environment along a trusted path. Nevertheless, the Commissioner maintains that the Board's findings concerning the content of the prior art are supported by four other references in the record. [FN1] The Commissioner argues that these additional references describe modified UNIX systems that allow communication over both trusted and untrusted paths. Therefore, the Commissioner argues, the Board's general findings concerning the content of the prior art have substantial evidence support, as does its ultimate conclusion of obviousness.

We are unpersuaded by the Commissioner's arguments. The Board's conclusion of obviousness was based on the UNIX and FILER2 references. The Board's findings with respect to these references simply cannot be supported by the alternative references identified by the Commissioner on remand. To the contrary, these alternative references merely confirm the well-known fact that conventional UNIX systems do not allow communication between the user and the trusted environment along a trusted path. For example, Johrie et al., U.S. Pat. No. 4,918,653, comments that "[s]ome examples of prior art multi-user operating systems which have not provided an effective mechanism for establishing a trusted path include UNIX" Johrie, col. 1, II. 60-63.

The Commissioner also cannot now mend the Board's faulty conclusion of obviousness by substituting these alternative references for those relied upon by the Board. This new combination of references would constitute a new ground for rejection, not considered or relied upon by the Examiner or the Board. It is well settled that it would be inappropriate for us to consider such a new ground of rejection. *In re Margolis*, 785 F.2d 1029, 1032; 228 USPQ 940, 942 (Fed. Cir. 1986); see also *Koyo Seiko Co., Ltd. v. United States*, 95

F.3d 1094, 1099 (Fed. Cir. 1996) (holding that "[t]he grounds upon which an administrative order must be judged are those upon which the record discloses that its action was based.") (quoting *SEC v. Chenery Corp.*, 318 U.S. 80, 87 (1943)).

Finally, the deficiencies of the cited references cannot be remedied by the Board's general conclusions about what is "basic knowledge" or "common sense" to one of ordinary skill in the art. As described above, the Board contended that even if the cited UNIX and FILER2 references did not disclose a trusted path, "it is basic knowledge that communication in trusted environments is performed over trusted paths" and, moreover, verifying the trusted command in UNIX over a trusted path is "nothing more than good common sense." *Ex parte Zurko*, slip op. at 8. We cannot accept these findings by the Board. This assessment of basic knowledge and common sense was not based on any evidence in the record and, therefore, lacks substantial evidence support. As an administrative tribunal, the Board clearly has expertise in the subject matter over which it exercises jurisdiction. This expertise may provide sufficient support for conclusions as to peripheral issues. With respect to core factual findings in a determination of patentability, however, the Board cannot simply reach conclusions based on its own understanding or experience -- or on its assessment of what would be basic knowledge or common sense. Rather, the Board must point to some concrete evidence in the record in support of these findings. [FN2] To hold otherwise would render the process of appellate review for substantial evidence on the record a meaningless exercise. *Baltimore & Ohio R.R. Co. v. Aderdeen & Rockfish R.R. Co.*, 393 U.S. 87, 91-92 (1968) (rejecting a determination of the Interstate Commerce Commission with no support in the record, noting that if the Court were to conclude otherwise "[t]he requirement for administrative decisions based on substantial evidence and reasoned findings -- which alone make effective judicial review *1698 possible -- would become lost in the haze of so-called expertise"). Accordingly, we cannot accept the Board's unsupported assessment of the prior art.

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CONCLUSION

The Board's conclusion of obviousness was based on a misreading of the references relied upon and, therefore, lacks substantial evidence support. Accordingly, the Board's judgment is reversed.

REVERSED.

FN1. Specifically, the Commissioner points to Johrie et al, U.S. Pat. No. 4,918,653; E.J. McCauley et al., *KSOS: The Design of a Secure Operating System*, Ford Aerospace and Communications Corp. (1979); Stanley R. Ames, Jr. et al., *Security Kernel Design and Implementation: An Introduction*, IEEE Cat. No. 830700-001 (July 1983); and Simon Wiseman et al., *The Trusted Path Between Smite and the User*, Proceedings 1988 IEEE Symposium on Security and Privacy (April 18-21, 1988).

FN2. As described above, we cannot accept the Commissioner's invitation to now search the record for references in support of the Board's general conclusions concerning the prior art. Even if any such references could support these conclusions, it would be inappropriate for us to consider references not relied upon by the Board. *In re Margolis*, 785 F.2d at 1032; 228 USPQ at 942.

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